

FSEIS ADDENDUM
WDFW LAKE REHABILITATION
PROJECT PROPOSALS
2008

LAKE MANAGEMENT PLAN

Updated June, 2008 – C. Donley

Water: Fourth Of July Lake (Lincoln Co.)

Location: Fourth of July Lake is located 2.2 miles south of Sprague, Washington.

	Size:	Max. Depth:	Volume:
Fourth of July Lake	112 acres	40 ft	2,016 acre feet

Water Source: Groundwater seeps, with limited overland flow.

Outflow: None

Management History:

Fourth Of July Lake has only been rehabilitated once in the history of WDFW fish management. September 30, 1958 the lake was treated with Toxaphene to eliminate common carp. Prior to the treatment, Fourth of July was commercially fished for common carp. As commercial value and interest waned for common carp the Department of Game rehabilitated Fourth of July Lake and created a winter production trout fishery. Since that initial treatment and stocking Fourth Of July Lake has provided an excellent winter opener fishery.

The current management objective for this lake is to provide for a production wintertime rainbow trout fishery. This type of fishery is prized as an opportunity for families to recreate together, as well as provides an appropriate challenge for occasional or novice anglers. Fourth of July Lake has provided a consistent winter ice fishery that has been popular for the entire greater Spokane angling base. The number of winter only fisheries in the greater Spokane area is limited to four production trout lakes. The limited amount of winter fishing opportunity renders Fourth of July Lake highly desirable to provide wintertime recreation.

Fourth of July is a closed system, highly alkaline basin that is close to too alkaline to support trout. As a result this lake is highly productive (eutrophic) and has a reputation of producing rainbow trout that consistently reach lengths of greater than 20 inches at age 3. This fishery has become increasingly popular; over 500 anglers participate in the opening day fishery for this lake. A steady decline in the fishery over the past 5 years has been observed and commented on by the angling public. Growth, condition and recruitment of rainbow trout in the fishery at Fourth of July have consistently dropped over the past 5 years. It was suspected that low water years and avian predation were contributing to the poorly performing fishery. While the aforementioned issues contributed to the poorly performing fishery, fathead minnows were detected during electrofishing sampling in 2003. Since 2003, fathead minnows have grown in abundance to the point where interspecific competition has eliminated rainbow trout spring fry recruitment, and negatively affected catchable rainbow trout condition, growth and recruitment to the fishery.

Fathead minnows are known competitors for secondary productivity with rainbow trout; their presence is the largest contributor to the decline in the fishery that has been observed over the last five years.

Generally, fathead minnows would be viewed as a potential forage source for larger piscivorous rainbow trout. Several attempts have been made to stock advanced sized rainbow trout to predate upon the minnows. The stock of rainbow available to plant has not proven to be an effective predator on fathead minnows. The stock of fish available for use is coastal rainbow trout; this stock is more inclined to be zooplanktivorous/insectivorous than piscivorous. This stock of rainbow trout is the only stock available to WDFW to plant in our lowland lakes program. Brown trout could be stocked in the lake that would utilize the forage base, but brown trout are difficult to catch. WDFW does not have the infrastructure or money to plant sufficient numbers of brown trout into the lake. Secondly, brown trout would predate upon and limit rainbow trout recruitment into the fishery, eliminating or at least limiting the species that fulfills the WDFW management objective for this lake.

The final attempt at controlling fathead minnows through the use of piscivorous fish is currently under investigation. WDFW has stocked tiger trout (hybrid brook trout x brown trout) into the lake in an attempt to control fathead minnows. Final sampling and analysis of the results will not be completed until January 2009. If tiger trout prove to be effective in limiting fathead minnow abundance the rehabilitation will not be conducted.

T&E Flora and Fauna: Professionals from many resource agencies have visited this site countless times during the last 50 years. No known report exists of any threatened or endangered species habitually found in or near these lakes. Occasional visits from both bald and golden eagles occur, although no nests of these two species are known in the area. Protected species of waterfowl and other birds frequently are found here at times, as well.

Current Management Objectives:

Fourth of July Lake is a winter lake opener, December 1 to March 31, production fishery. Five fish limit, no more than 2 greater than 14 inches, no gear restrictions. Provide 2 to 5 rainbow trout per angler trip with a carryover harvest rate of 20 to 25 percent. Fishery should generate a minimum of 5,000 angler-trips per season.

1. Fishery Objectives:

Species	Type	Category	Fish/Hour	Fish/Angler	Exploit. Rate
Rainbow	Production	Opening Day	2	3 to 5	50% 1 yr cohort
Rainbow	Production	Remainder of season	1	2 to 3	50% 1 yr cohort

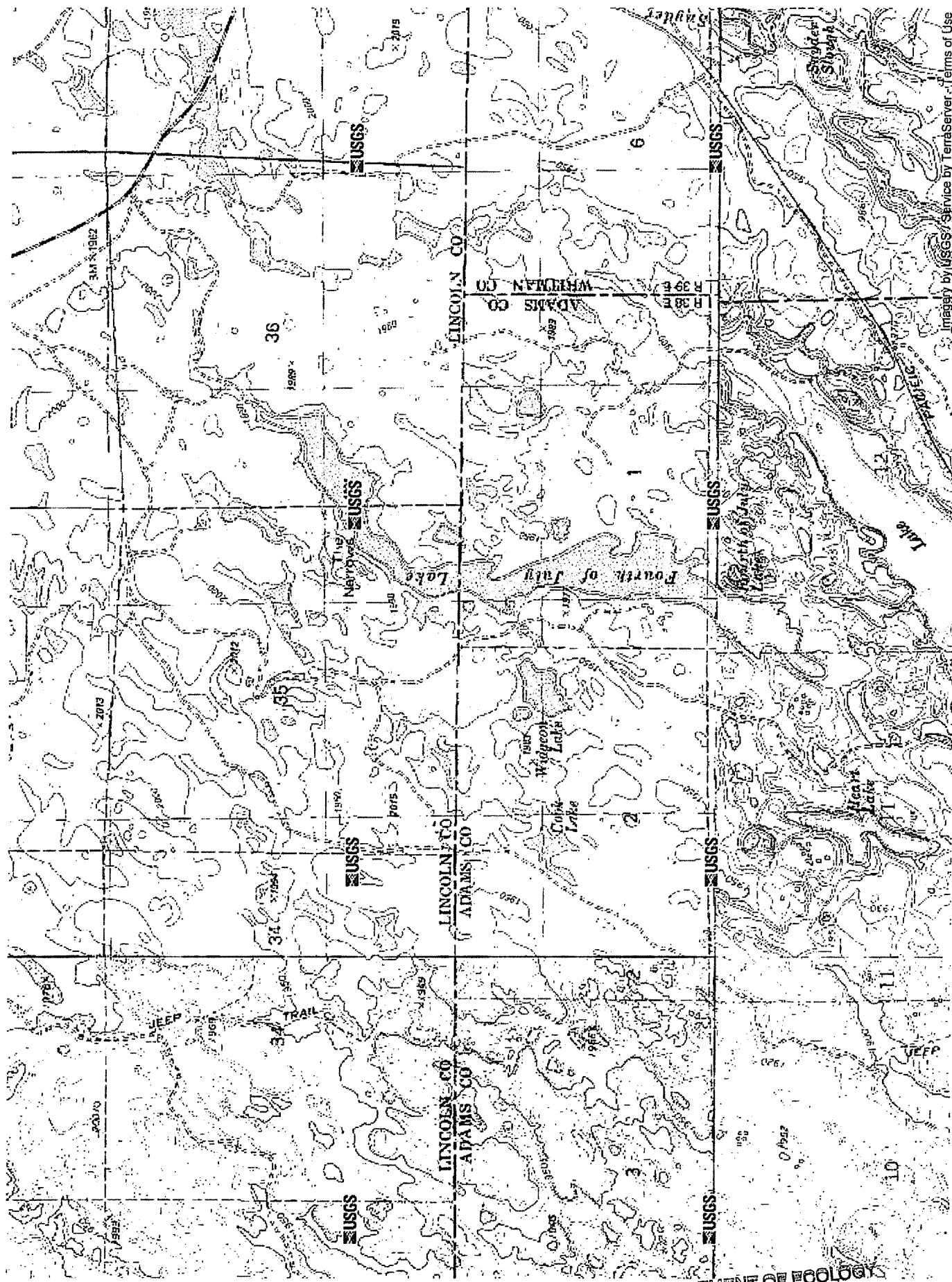
2. Angler use objective (# angler days): Season – 5,000 angler days on water

3. Stocking Objectives:

<u>Lake</u>	Species	Number of Fish Stocked			Planting Month
		Total	/Acre	/Pound	
4 th July- year 1	Rainbow	35,000	312	≤20	October
Year 2	Rainbow	30,000	267	<100	April-May
Year 3	Rainbow	60,000	535	<100	April-May
	Rainbow	20,000	178	≤ 5	March
Year 4	Rainbow	60,000	535	<100	April-May
	Rainbow	20,000	178	≤ 5	March
Year 5	Rainbow	60,000	535	<100	April-May
	Rainbow	20,000	178	≤ 5	March

Management Strategy:

- Plant rainbow trout fry fall 2009 and spring fry and catchables during successive springs.
- Check yearling growth; should be about 12 inches, adjust stocking rate as necessary.
- Harvest 50% of age 1 fish by end of season.
- Monitor all fish species periodically by electrofishing or netting.
- Control undesirable species with rotenone when trout survival is inadequate to produce an acceptable fishery.



DEPARTMENT OF ECOLOGY

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PRE-REHABILITATION PLAN

Fourth of July Lake (Lincoln County)

I. PROPOSAL

A. Justification for Proposed Rehabilitation

The management objective for this lake is to provide for a production wintertime rainbow trout fishery. This type of fishery is prized as an opportunity for families to recreate together, as well as provides an appropriate challenge for occasional or novice anglers.

Fourth Of July Lake has only been rehabilitated once in its history of WDFW fish management. September 30, 1958 the lake was treated with Toxaphene to eliminate common carp. Since that initial treatment and stocking Fourth Of July Lake has provided an excellent winter opener fishery.

Fourth of July is a closed, highly alkaline basin that is close to too alkaline to support trout. As a result this lake is highly productive (eutrophic) and has a reputation of producing rainbow trout that consistently reach lengths of greater than 20 inches at age 3. This fishery has become increasingly popular; over 500 anglers participate in the opening day fishery for this lake. A steady decline in the fishery over the past 5 years has been observed and commented on by the angling public.

Growth, condition and recruitment of rainbow trout in the fishery at Fourth of July have consistently dropped over the past 5 years. It was suspected that low water years and avian predation were contributing to the poorly performing fishery. While the aforementioned issues contributed to the poorly performing fishery, fathead minnows were detected during electrofishing sampling in 2003. Since 2003, fathead minnows have grown in abundance to the point where interspecific competition has eliminated rainbow trout spring fry recruitment, and negatively affected catchable rainbow trout condition, growth and recruitment to the fishery. Fathead minnows are known competitors for secondary productivity with rainbow trout; their presence is the largest contributor to the decline in the fishery that has been observed over the last five years.

Generally, fathead minnows would be viewed as a potential forage source for larger piscivorous rainbow trout. Several attempts have been made to stock advanced sized rainbow trout to predate upon the minnows. The stock of rainbow available to plant has not proven to be an effective predator on fathead minnows. The stock of fish available for use is coastal rainbow trout; this stock is more inclined to be zooplanktivorous/insectivorous than piscivorous. This stock of rainbow trout is the only stock available to WDFW to plant in our lowland lakes program. Brown trout could be stocked in the lake that would utilize the forage base, but brown trout are difficult to catch. WDFW does not have the infrastructure or money to plant sufficient numbers of brown trout into the lake. Secondly, brown trout would predate upon and limit rainbow trout recruitment into the fishery, eliminating or at least limiting the species that fulfills the WDFW management objective for this lake.

The final attempt at controlling fathead minnows through the use of piscivorous fish is currently under investigation. WDFW has stocked tiger trout (hybrid brook trout x brown trout) into the

lake in an attempt to control fathead minnows. Final sampling and analysis of the results will not be completed until January 2009. If tiger trout prove to be effective in limiting fathead minnow abundance the rehabilitation will not be conducted.

B. Physical Description of Water Proposed for Rehabilitation

1. WATER: **Fourth of July Lake**
2. LOCATION: Sec 1 and 2, T20N R38E Lincoln County
3. SURFACE ACRES: 112 MAXIMUM DEPTH: 40ft
4. VOLUME: 2016 acre-feet; 5,483,520,000 lbs H₂O
5. OUTLET: None
6. STREAM: N/A
7. PUBLIC ACCESS: Yes
8. LAND OWNERSHIP: PUBLIC 10% (DNR leased by WDFW) PRIVATE 90% (Single Landowner)
9. ESTABLISHED RESORTS: None on lake

C. Proposed Management Actions

1. WATER: **Fourth of July Lake**
2. TARGET SPECIES: fathead minnow
3. DATE LAST REHABED: September 30, 1958, treated with Toxaphene
4. PROPOSED TREATMENT DATE: March- April 2009 rehab may be put off depending on fishery results of fall/winter 2008.
5. REPLANTING DATE: Fall 2009 for fry and 2010 for catchables
6. SPECIES: rainbow trout
7. CATCHABLES: 20,000 FINGERLINGS: 40,000 fall fry
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 4 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 21000 lbs., 20 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat spray
10. CREW DESCRIPTION: Leader(s) Chris Donley, Personnel ~ 8

II. PURPOSE:

The Washington Department of Fish and Wildlife (DFW) provides many types of fisheries in response to public desires. WDFW manages both trout and warmwater recreational fisheries based on many different species of fish and levels of difficulty. Public demand for and participation in production trout fisheries is high. These fisheries are prized as opportunities for families to recreate together, as well as providing an appropriate challenge for occasional or novice anglers. Winter Lakes Opening Day trout fisheries provide a relaxed recreational opportunity, give anglers outdoor opportunity during late fall and winter months, and are also integral to the State and local economies.

Alternatives to rehabilitation are costly or impossible. To maintain a reasonably comparable fingerling-stocked trout fishery in these waters with catchable-sized fish would take 20,000 – 30,000 catchable rainbow. Stocking catchable sized fish costs almost ten times the cost of a fry

plant, and Region One lacks the hatchery space and water to institute a catchable fish-stocking program as a substitute for lake rehabilitation. Spring fry survival in lakes free of competing species ranges from 50-80 percent. Regardless of fish size at stocking, interspecific competition with fathead minnows limits fish growth and condition significantly. Ultimately, reduced trout recruitment and fish quality lead to an undesirable trout fishery.

III. INTENDED OUTCOME/MEASURE OF SUCCESS:

WDFW intends to restore Fourth of July Lake to a popular, easily accessible winter trout fishery based on fingerling-stocked trout. The average catch rates should be 3 to 5 fish/angler on opening day, with a sustained harvest of 2 to 3 fish/angler for the duration of the season. Spring fry should be a minimum of 12 inches, and carryover harvest should be 20 to 25 percent of the overall harvest. Success will be measured during Opening Day and random creel contacts and biological surveys. Given a reasonable chance of eliminating the population of undesirable species, the beneficial effects should last approximately 20 years under current management schemes. In addition to reasons listed under Resource, Recreational and Economic Impacts, to abandon this lake as a trout fishery is to invite other incursions across the state in trout only managed lakes.

IV. RESOURCE IMPACTS:

1. The population of the target species, fathead minnow, will be severely and negatively impacted. The aforementioned species is an exotic species that is not desired for a fishery under the current lake management plan.
2. Regional Lands, Habitat, Wildlife and Non-Game managers have been appraised of our rehabilitation plans. No unmitigated concerns have been expressed on the potential impacts to non-targeted species.
3. According to Bradbury (1986), the effects of rotenone on benthos are variable, depending on the concentrations and species. Crustaceans are most tolerant while the smaller insects are most affected. Immediate reduction of populations averages 25%, and survival doubles when access to bottom sediments exists. Benthic communities generally recover to at least pretreatment levels within two months. Zooplankton is more severely impacted, and communities generally take two to twelve months to fully recover. While relatively tolerant of even heavy doses of rotenone, amphibians (especially larval) are at risk, and herptiles are affected somewhat less so. Almost no chance of eliminating an entire population exists.
4. During treatment the lake will be closed to angling, and other recreational uses such as boating, and swimming will be curtailed during the planned period of treatment. There will be a loss of the winter fishery for 2010 associated with our activities. The lake will be stocked to provide a fishery with catchable sized and fall fry rainbow trout prior to the Winter Lakes Opener in 2010.
5. Professional biologists and other naturalists have visited these sites frequently over the past 50 years. To our knowledge, no endemic, rare, threatened or otherwise listed species will be impacted by the rehabilitation.

V. MITIGATING FOR ADVERSE IMPACTS:

1. Trout fry survival and growth for the proposed water will be greatly enhanced, and the future trout fishery will attain the previous status. No removal of dead fish is planned as the nutrient base contained therein is best returned to the lake.
2. Early Spring rehabilitation will not interfere with waterfowl late spring nesting. The eradication fathead minnow will also benefit waterfowl through increased production of invertebrates. Stocked populations of trout will not be anywhere near as numerous as the current fathead minnow population.
3. Livestock use of the waters to be treated will not be significantly affected. The concentration of rotenone used in the treatment will be far below that considered harmful to mammals. The landowners will be notified of the rehabilitation and consequent exposure of livestock to rotenone.
4. No endemic, rare, threatened or otherwise listed species are known to inhabit this area.
5. Protective wear for the eyes, face and hands will be available for all purveyors of rotenone.
6. Lakes will be posted according to Department of Ecology guidelines to notify the public of the treatment and discourage the public from possessing or consuming dead fish.

VI. RECREATIONAL IMPACT:

See Section III.

Angler success should reach 3 to 5 fish/angler on the opener and 2-3 fish/angler sustained harvest for the duration of the season. Yearling trout should average about 12 inches. Carryovers should be expected to be about 20 to 25 percent of the catch and average 15 inches for 2-year-olds and 18 inches for 3-year-olds.

VII. ECONOMIC IMPACTS:

An estimated minimum of 5,000 trips annually will be made to Fourth of July Lake as a result of the proposed management action would result in an increased economic impact totaling \$189,500 per year (1991 dollars; based WDW estimate of \$37.90 per trip). If the project is successful for 10 years it will generate a minimum of \$1,895,000 in economic activity. The total annual cost to plant these lakes with rainbow trout is less than \$10,000. The rehabilitation will cost the Department about \$50,000 (including costs of rotenone, time, travel). The investment by the state is realized within 2 years following treatment.

Estimates for the cost of the enforcement action necessary to curtail the activity of the individuals responsible for illegal fish plants are not available. However, this cost might be looked upon as a statewide expenditure since some preventive benefit would certainly occur as perpetrators find

out the Department takes illegal transport and planting of fish very seriously.

VIII. RELATED MANAGEMENT ACTION:

See I.C.6. for fish planting data

Increased penalties and enforcement activities are desirable if WDFW is ever going to dissuade illegal stocking of state managed waters. Educating the public about the costs in Department dollars and time with emphasis on what WDFW might be able to accomplish with those resources would be a very worthwhile activity for WDFW Public Affairs. This may result in stemming recruitment to this ill advised group and turning local opinion against the offenders.

IX. PUBLIC CONTACT:

Public meetings will be held during July 2008 in Ephrata, Spokane, Colville and Olympia to explain WDFW's 2008-09 rehabilitation proposals, assess public opinion, and address local concerns.

Initiated by: Region One, District 2 Fisheries Management

LAKE MANAGEMENT PLAN
Updated June, 2008 – C. Donley

Water: Ellen Lake (Ferry Co.)

Location: Ellen Lake is located 14 miles north of Ichelium. Ellen Lake has a seasonal intermittent drainage to Lake Roosevelt (Columbia River) through La Fleur Creek.

	Size:	Max. Depth:	Volume:
Ellen Lake	82 acres	31 ft	902 acre feet

Water Source: Mostly groundwater seeps, with limited overland flow.

Outflow: Ellen Lake has a seasonal intermittent drainage to Lake Roosevelt (Columbia River) through La Fleur Creek.

Management History:

Ellen Lake has been managed since the 1950s as a production rainbow trout water, and with a lowland lakes opener (last Saturday in April to October 31). This lake is known to have good growth rates for fingerling stocked rainbow trout. Growth rates and recruitment of rainbow trout are severely affected by the presence of undesirable species of fish in this lake.

Up until the mid-1980s the lake had not been treated with rotenone. Repeated illegal introductions of largemouth bass and other smaller compressed-form centrarchids has become commonplace, requiring rotenone treatment on a regular schedule. The lake has been treated with rotenone in 1989, 1994 and 2004. In an attempt to prevent repeated illegal stocking, WDFW has enacted a fishing regulation that precludes anglers from harvesting any species other than trout from this water. The intent of the regulation is to diminish the value of illegal introductions if the fish cannot be harvested.

T&E Flora and Fauna: Professionals from many resource agencies have visited this site countless times during the last 50 years. No known report exists of any threatened or endangered species habitually found in or near these lakes. Occasional visits from both bald and golden eagles occur, although no nests of these two species are known in the area. Protected species of waterfowl and other birds frequently are found here at times, as well.

Current Management Objectives:

Ellen Lake is a lowland lake opener, last Saturday in April to October 31, production fishery. Five fish limit, no size or gear restrictions. Provide 2 to 5 rainbow trout per angler trip with a carryover harvest rate of 0 to 5 percent. Fishery should generate a minimum of 2,500 angler-trips per season.

1. Fishery Objectives:

Species	Type	Category	Fish/Hour	Fish/Angler	Exploit. Rate
Rainbow	Production	Opening Day	2	3 to 5	90% 1 yr cohort
Rainbow	Production	Remainder of season	1	2 to 3	90% 1 yr cohort

2. Angler use objective (# angler days): Season – 2,500 angler days on water

3. Stocking Objectives:

<u>Lake</u>	Species	Number of Fish Stocked			Planting Month
		Total	/Acre	/Pound	
Ellen- year 1	Rainbow	8,000	98	≤ 5	March -April
Year 2	Rainbow	20,000	240	<100	April-May
Year 3	Rainbow	20,000	240	<100	April-May
Year 4	Rainbow	20,000	240	<100	April-May
Year 5	Rainbow	20,000	240	<100	April-May

Management Strategy:

- Plant rainbow trout catchable spring 2009 and spring fry during successive springs.
- Check yearling growth; should be about 11 inches, adjust stocking rate as necessary.
- Harvest 90% of age 1 fish by end of season.
- Monitor all fish species periodically by electrofishing or netting.
- Control undesirable species with rotenone when trout survival is inadequate to produce an acceptable fishery.



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PRE-REHABILITATION PLAN

Ellen Lake (Ferry County)

I. PROPOSAL

A. Justification for Proposed Rehabilitation

Ellen Lake has historically been a popular Lowland lake Opening Day trout fishery in the Kettle Falls area. Repeated Illegal introductions of largemouth bass have plagued trout production on this lake for the past 20 plus years. Through regulation modification and the use of rotenone to rehabilitate the lake, it is anticipated that this lake will return to a productive trout fishery.

Ellen Lake has been illegally stocked with largemouth bass and green sunfish. The resulting fish population in this lake has provided a limited recreational fishery since the illegal introduction. Ellen Lake has a small amount of appropriate warmwater fish habitat, thus preventing the development of a quality utilizable warmwater fishery. WDFW is proposing to rehabilitate the lake and restock with rainbow trout. Similar to Hatch Lake and Williams Lake in the Colville area, it appears there are anglers that enjoy fishing for bass in Ellen Lake and persist in illegally stocking the fish following our management actions. To combat these "bucket biologists" WDFW enacted the regulation on Ellen Lake to make it "catch and release except for trout". The intent of the new regulation is to make harvesting any species from the lake other than trout illegal. Thus, preventing the illegal introduction of warmwater fish for the sole purpose of prospecting for a few "good" years of fishing on the illegally introduced species that fits a narrow agenda that does not benefit the desired angler demand.

B. Physical Description of Water Proposed for Rehabilitation

1. WATER: **Ellen Lake**
2. LOCATION: Sec 26 and 27, T37N R36E Ferry County
3. SURFACE ACRES: 82 MAXIMUM DEPTH: 31ft
4. VOLUME: 902 acre-feet; 2,453,440,000 lbs H2O
5. OUTLET: None
6. STREAM: N/A
7. PUBLIC ACCESS: Yes
8. LAND OWNERSHIP: PUBLIC 100% (U.S. Forest Service)
9. ESTABLISHED RESORTS: None on lake

C. Proposed Management Actions

1. WATER: **Ellen Lake**
2. TARGET SPECIES: largemouth bass, green sunfish
3. DATE LAST REHABED: October 2004
4. PROPOSED TREATMENT DATE: September-November, 2008
5. REPLANTING DATE: Spring 2009
6. SPECIES: rainbow trout
7. CATCHABLES: 2,500-10,000 FINGERLINGS: 10,000-30,000
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 1 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 2400 lbs., 5 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat spray
10. CREW DESCRIPTION: Leader(s) Chris Donley, Personnel ~ 6

II. PURPOSE:

The Washington Department of Fish and Wildlife (DFW) provides many types of fisheries in response to public desires. WDFW manages both trout and warmwater recreational fisheries based on many different species of fish and levels of difficulty. Public demand for and participation in production trout fisheries is high. These fisheries are prized as opportunities for families to recreate together, as well as providing an appropriate challenge for occasional or novice anglers. Lowland Lakes Opening Day trout fisheries provide a relaxed recreational opportunity, give anglers outdoor opportunity during the spring, summer and fall months, and are also integral to the state and local economies.

Alternatives to rehabilitation are costly or impractical. To maintain a comparable fingerling-stocked trout fishery in these waters with catchable-sized fish would take 7,500 – 15,000 catchable rainbow. Stocking catchable sized fish costs almost ten times the cost of a fry plant, and Region One lacks the hatchery space and water to institute a catchable fish-stocking program as a substitute for lake rehabilitation. Spring fry survival in lakes free of competing species ranges from 50-80 percent. Regardless of fish size at stocking, interspecific competition with warmwater fishes limits fish growth and condition significantly. Ultimately, reduced trout recruitment and fish quality lead to an undesirable trout fishery.

III. INTENDED OUTCOME/MEASURE OF SUCCESS:

WDFW intends to restore Ellen Lake to a popular, easily accessible trout fishery based on fingerling-stocked trout. The average catch rates should be 3 to 5 fish/angler on the opener with a sustained harvest of 2 to 3 fish/angler for the duration of the season. Spring fry should be a minimum of 11 inches, and carryover harvest should be 5 to 10 percent of the overall harvest. Success will be measured during Opening Day and random creel contacts and biological surveys. Given a reasonable chance of reducing the populations of undesirable species dramatically, the beneficial effects should last approximately 6 to 8 years under current management schemes. In addition to reasons listed under Resource, Recreational and Economic Impacts, to abandon this lake as a trout fishery is to invite other incursions across the state in trout only managed lakes.

IV. RESOURCE IMPACTS:

1. The population of the target species, largemouth bass and green sunfish, will be severely and negatively impacted. The aforementioned species are exotic species that are not desired for a fishery under the current lake management plan.
2. Regional Lands, Habitat, Wildlife and Non-Game managers have been appraised of our rehabilitation plans. No unmitigated concerns have been expressed on the potential impacts to non-targeted species.
3. According to Bradbury (1986), the effects of rotenone on benthos are variable, depending on the concentrations and species. Crustaceans are most tolerant while the smaller insects are most affected. Immediate reduction of populations averages 25%, and survival doubles when access to bottom sediments exists. Benthic communities generally recover to at least pretreatment levels

within two months. Zooplankton is more severely impacted, and communities generally take two to twelve months to fully recover. While relatively tolerant of even heavy doses of rotenone, amphibians (especially larval) are at risk, and herptiles are affected somewhat less so. Almost no chance of eliminating an entire population exists.

4. During treatment the lake will be closed to angling, and other recreational uses such as boating, and swimming will be curtailed during the planned period of treatment. There will be no loss of a fishery associated with our activities. Ellen Lake will be stocked to provide a fishery with catchable sized rainbow trout in the spring of 2009 prior to the Lowland Lakes Opening Day.

5. Professional biologists and other naturalists have visited these sites frequently over the past 40 years. To our knowledge, no endemic, rare, threatened or otherwise listed species will be impacted by the rehabilitation.

V. MITIGATING FOR ADVERSE IMPACTS:

1. Trout fry survival and growth for the proposed water will be greatly enhanced, and the future trout fishery will attain the previous status. No removal of dead fish is planned as the nutrient base contained therein is best returned to the lake.

2. Fall rehabilitation will not interfere with waterfowl spring nesting. The eradication of largemouth bass and green sunfish will also benefit waterfowl through increased production of invertebrates. Stocked populations of trout will not be anywhere near as numerous as the current largemouth bass and green sunfish population.

3. Livestock use of the waters to be treated will not be significantly affected. The concentration of rotenone used in the treatment will be far below that considered harmful to mammals. The landowners will be notified of the rehabilitation and consequent exposure of livestock to rotenone.

4. No endemic, rare, threatened or otherwise listed species are known to inhabit this area.

5. Protective wear for the eyes, face and hands will be available for all purveyors of rotenone.

6. Lakes will be posted according to Department of Ecology guidelines to notify the public of the treatment and discourage the public from possessing or consuming dead fish.

VI. RECREATIONAL IMPACT:

See Section III.

Angler success should reach three to five fish per trip on the opener and 2-3 fish/angler sustained harvest for the duration of the season. Yearling trout should average about 11 inches. Carryovers should be expected to be about 10 to 15 percent of the catch and average 13 inches for 2-year-olds and 16 inches for 3-year-olds.

VII. ECONOMIC IMPACTS:

An estimated minimum of 2,500 trips made to Ellen Lake as a result of the proposed management action would result in an increased economic impact totaling \$95,000 per year (1991 dollars; based WDW estimate of \$37.90 per trip). If the project is successful for 8 years it will generate a minimum of \$760,000 in economic activity. The total annual cost to plant these lakes with rainbow trout fry is less than \$2,000. The rehabilitation will cost the Department about \$30,000 (including costs of rotenone, time, travel). The investment by the state is realized more than 10-fold in economic activity after the second year following treatment.

Estimates for the cost of the enforcement action necessary to curtail the activity of the individuals responsible for illegal fish plants are not available. However, this cost might be looked upon as a statewide expenditure since some preventive benefit would certainly occur as perpetrators find out the Department takes illegal transport and planting of fish very seriously.

VIII. RELATED MANAGEMENT ACTION:

See I.C.6. for fish planting data

Increased penalties and enforcement activities are desirable if WDFW is ever going to dissuade illegal stocking of state managed waters. Educating the public about the costs in Department dollars and time with emphasis on what WDFW might be able to accomplish with those resources would be a very worthwhile activity for WDFW Public Affairs. This may result in stemming recruitment to this ill advised group and turning local opinion against the offenders.

IX. PUBLIC CONTACT:

Public meetings will be held during July 2008 in Ephrata, Spokane, Colville and Olympia to explain WDFW's 2008-09 rehabilitation proposals, assess public opinion, and address local concerns.

Initiated by: Region One, District 2 Fisheries Management

LAKE MANAGEMENT PLAN

Water: Worth Lake

Management Type: Warm Water (Largemouth Bass and Bluegill)

Location: Colonial Road, four miles east of Basin City, Washington in Franklin County, Sec 20, T13N, R30E

Size: 12 acres, 10 feet maximum depth, 75-120 acre-feet, depending on control structure weirs

Water Source: Intermittent irrigation and wetland runoff

Outflow: Irrigation canal (intermittent)

Management History:

Historically, Worth Lake has provided rainbow trout and warm water angling opportunities. Between 1958-1979, WDFW stocked the lake with over 83,000 rainbow trout. WDFW records indicate that no stocking occurred between 1980 and 1999. In 2000, 75 adult black crappie were stocked into Worth Lake and rainbow trout were again stocked in 2004. No crappie or rainbow trout were sampled during a population survey in 2005. Worth Lake has been rehabilitated twice since 1969 (1969 and 1979) in efforts to eliminate non-game fishes such as carp. However, because of the lake's connectivity to the Columbia Basin irrigation system and/or limited rehabilitation success, carp always re-inhabit the lake within several years. A fish survey conducted in 1998 by WDFW Warmwater Program personnel revealed that carp had once again immigrated into the lake. In 2004, the original water control structure was reconstructed at the outlet of the lake to regulate water levels and to prevent upstream immigration of carp. Carp removal efforts using electrofishing were conducted in 2005, 2006, 2007, and 2008. Carp densities have remained at low-to-moderate levels in recent years.

Current Management Objectives:

We intend to establish Worth Lake as a successful warm water fishery and improve its popularity by maintaining the lake as one of the few local waters with moderate to strong populations of both largemouth bass and bluegill. Given a reasonable chance of eliminating the populations of undesirable species, the beneficial effects should be noticeable one-two years post treatment.

Fishery Objectives:

<u>Species</u>	<u>Type</u>	<u>Category</u>	<u>Fish/hour</u>	<u>Fish/angler</u>	<u>Ave size</u>
Largemouth Bass	Quality	Statewide	2-4	6-12	50% <10" 40% 10"-14" 10% 14"+
Bluegill	Quality	Statewide	6-12	12-24	90% <6" 10% 6"+

Angler use objective (# angler days/week): 10-20

Stocking Objectives:

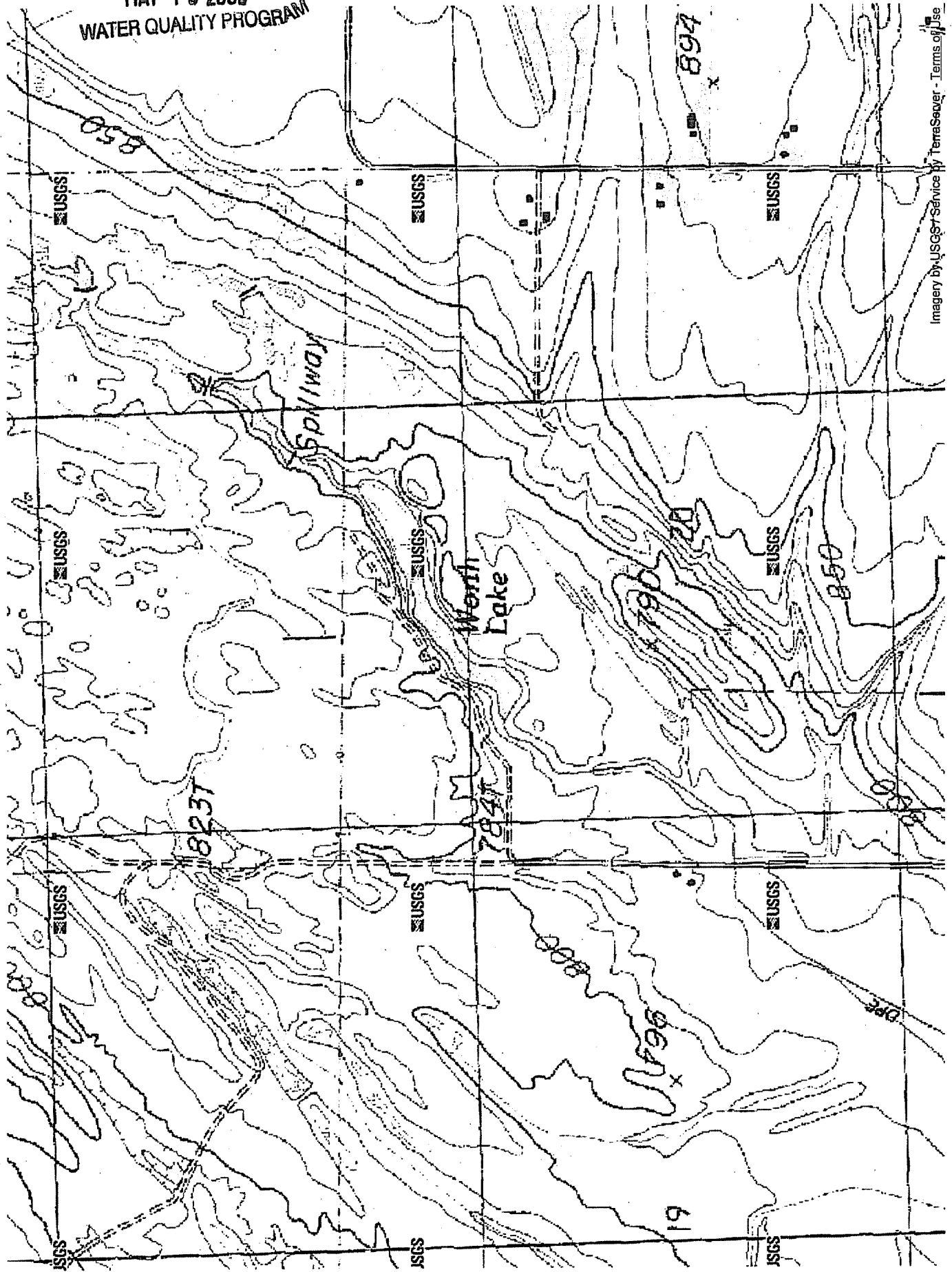
<u>Species</u>	<u>Total Fish</u>	<u>Fish/Acre</u>	<u>Fish/lb</u>	<u>Planting Month</u>
Largemouth bass	25	2	1.0	May
Largemouth bass	1,200	100	50+	October
Bluegill	250	21	5.0	May
Bluegill	4,800	400	50+	October

Management Strategy:

- Maintain Statewide Regulations including slot limit for largemouth bass
- Provide an abundant bluegill fishery
- Develop a quality largemouth bass population and fishery
- Monitor angling activity and catch rates periodically throughout season
- Closely monitor any invasive species and react immediately to control population by all means before treating with rotenone (angling, electroshocking, netting, and regulation changes).

DEPARTMENT OF ECOLOGY

MAY 15 2000
WATER QUALITY PROGRAM



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U.S. DEPARTMENT OF JUSTICE
FEDERAL BUREAU OF INVESTIGATION

PRE-REHABILITATION PLAN

Worth Lake

I. PROPOSAL

A. Justification for Proposed Rehabilitation

Worth Lake is located northwest of Mesa, Washington in Franklin County. Worth Lake has an approximate surface area of 5 hectares (12 acres), a mean depth of 2 meters (m), and a maximum depth of 3.5 m. The lake is fed by intermittent irrigation and wetland runoff while water exits the lake through an irrigation canal on the southwest end. Development around the lake is limited primarily to agriculture. A Washington Department of Fish and Wildlife (WDFW) parking site provides shoreline and hand-launch boat access to the lake. Historically, Worth Lake has provided rainbow trout (*Oncorhynchus mykiss*) and warmwater angling opportunities. Between 1958-1979, WDFW stocked the lake with over 83,000 rainbow trout. WDFW records indicate that no stocking occurred between 1980 and 1999. In 2000, 75 adult black crappie, *Pomoxis nigromaculatus*, were stocked into Worth Lake and rainbow trout were again stocked in 2004. No crappie or rainbow trout were sampled during a population survey in 2005. Worth Lake has been rehabilitated twice since 1969 (1969 and 1979) in efforts to eliminate non-game fishes such as carp (*Cyprinus carpio*). However, because of the lake's connectivity to the Columbia Basin irrigation system and/or limited rehabilitation success, carp always re-inhabit the lake within several years. A fish survey conducted in 1998 by WDFW Warmwater Program personnel revealed that carp had once again immigrated into the lake. In 2004, the original water control structure was reconstructed at the outlet of the lake to regulate water levels and to prevent upstream immigration of carp. Carp removal efforts using electrofishing were conducted in 2006, 2007, and 2008. Carp densities have remained at low-to-moderate levels in recent years.

On June 14-15, 2005, personnel from the WDFW Warmwater Enhancement Program, along with district fish biologists, conducted a fishery assessment on Worth Lake. The results from this survey were used to assess the current status of the fish community and to identify possible enhancement opportunities. Six fish species were collected from Worth Lake in June 2005. Warmwater gamefish comprised approximately 97 percent of the total fish captured. Yellow perch was the most abundant species (95.5%) encountered in the samples, but contributed only 40% of the biomass. Conversely, carp comprised only 2.9% of the total number sampled, but accounted for over 51% of the total biomass. Largemouth bass, bluegill, sculpin, and pumpkinseed, combined, contributed less than 2% of the sample by number and less than 9% of the biomass. Largemouth bass sampled from Worth Lake ranged in total length from 177 to 491 mm and ranged in age from 1 to 7 years. Growth of Worth Lake largemouth bass far exceeded the eastern Washington average at all ages. Yellow perch sampled from Worth Lake ranged in total length from 41 to 282 mm and ranged in age from 1 to 3 years. Growth of Worth Lake yellow perch far exceeded the Washington statewide average at all ages. Although Worth Lake yellow perch exhibited good growth, their condition was far below the national 75th percentile. At the time of this survey, Worth Lake showed indications of having a prey crowded fish community dominated by small yellow perch. The poor condition, high overall sample size, and low stock density index values indicate extensive intra-specific competition for available resources. Electrofishing and fyke netting CPUE for yellow perch during this 2005 survey was higher than what was observed in a past survey in 1998. Length frequency and CPUE data suggest that a large proportion of Worth Lake yellow perch are fish at or below stock size (130 mm) and this population likely provides little fishing opportunity.

The good condition and low sample size of largemouth bass in Worth Lake suggests a low density population with ample food resources. Largemouth bass are likely preying upon the abundant small yellow perch in the lake. Divens and Phillips (2000) observed a highly abundant largemouth bass population in 1998 with electrofishing CPUE of 118 largemouth bass/hr. In contrast, electrofishing CPUE of largemouth bass in 2005 (52 fish/hr.) was less than half of that observed in 1998, indicating that their density has reduced in the last seven years. Although largemouth bass up to 491 mm (~19 inches) were sampled in Worth Lake in 2005, their numbers are few, which limits angling opportunity.

Carp were highly abundant in Worth Lake at the time of this survey. In 1998, Divens and Phillips (2000) observed low numbers of carp in the lake and suggested that they were entering the lake through the irrigation canal system. In 2004, a water control structure was constructed at the outlet to prevent carp from immigrating upstream into the lake. Since carp were present in the lake when the control structure was built, subsequent efforts were made to mechanically remove them using electrofishing. The first effort, immediately following this survey in June 2005, yielded 161 carp, which were sacrificed and discarded. A second effort in November 2005 yielded 940 carp.

Black crappie stocked at low densities in 2000, were not observed during sampling in 2005, which suggests low survival. Historically, management biologists have discouraged the stocking of crappie in small waters (Swingle 1952; Jenkins 1958; Hackney 1975). Jenkins (1957) found that only two of the sixteen small Oklahoma ponds evaluated supported adequate numbers of harvestable size crappie. Today, states like Missouri do not recommend stocking crappie in lakes less than 40 ha (Dillard 1982). If Worth Lake were rehabilitated, warm water species such as largemouth bass and bluegill, or a combination of warm water species and trout, may produce the best angling opportunities for the public.

Worth Lake historically has been managed as a mixed species water, trout and warm water. Currently, angling opportunities are limited with a large population of undersize yellow perch and minimal numbers of largemouth bass. Treatment of the lake is needed to establish a quality fishery.

Primary management of this waters is for largemouth bass and bluegill.

The Ringold Meseberg Hatchery (RMH) is the only State operated warm water species incubation and rearing facility in Washington. Currently, broodstock for production of largemouth bass and bluegill is collected off site and transported to the facility as there are no local populations sufficient in magnitude to meet broodstock needs. If the bass and bluegill populations are restored at Worth Lake it may help to meet the needs for hatchery production. Adults could be electrofished at Worth Lake, transported to RMH, allowed to spawn, and then returned to the lake. Distance from the lake to the hatchery is approximately 12 miles.

B. Physical Description of Water Proposed for Rehabilitation

WATER: Worth Lake
LOCATION: Sec 20, T13N, R30E, Franklin Co.
SURFACE ACRES: 12
MAX. DEPTH: 10ft
VOLUME: 75-120 acre-feet
OUTLET: Water control structure within irrigation canal
STREAM: MILES N/A FLOW (cfs): 1-6 cfs
PUBLIC ACCESS: WDFW, Bureau of Reclamation
LAND OWNERSHIP: State (Public) 100%
ESTABLISHED RESORTS: None

C. Proposed Management Actions

WATER: Worth Lake

TARGET SPECIES: Common carp, yellow perch

DATE LAST REHABED: March 1979

PROPOSED TREATMENT DATE: March 2009

REPLANTING DATE: May 2009

SPECIES: Largemouth Bass & Bluegill

STOCKING: Largemouth, 25 adult (>10"), 1,200 fingerling (2"-4")

Bluegill, 250 adult, 4,800 fingerling (2"-4")

PROPOSED TOXICANT: Rotenone, powder

CONCENTRATION: 2 ppm

AMOUNT (ROTENONE AT 5% ACT. INGRED): 300 lbs powder, 30 gallons liquid

METHOD OF APPLICATION: small pumper boat - slurry and spray; backpack sprayers

CREW DESCRIPTION: Leader Jeff Korth, Personnel 3-4

II. PURPOSE:

Public demand for and participation in warm water fisheries is very high. These fisheries are prized as opportunities for the angler or family recreation. Year around season fisheries provide a relaxed recreational opportunity and are also integral to the state and local economies. The District 4 area, Benton and Franklin counties, has relatively few lakes, fewer lakes with public access, and even fewer lakes that can be actively managed due to the connectivity of most lakes through an elaborate system of irrigation canals. These canals allow immigration of unwanted species and out migration of desirable species. Currently, angling opportunities at Worth Lake are limited with a large population of undersize yellow perch and minimal numbers of largemouth bass. Treatment of the lake is needed to establish a quality warm water fishery. A secondary goal is to establish a local broodstock for the Ringold-Meseberg Warm Water Hatchery. Complete rehabilitation is the only feasible method of restoring these waters to a largemouth bass/bluegill management scheme. Complete removal of all species is the goal of the rehabilitation.

III. INTENDED OUTCOME/MEASURE OF SUCCESS:

We intend to establish Worth Lake as a successful warm water fishery and improve its popularity by maintaining the lake as one of the few local waters with moderate to strong populations of both largemouth bass and bluegill. Success of this measure will be apparent during random creel surveys and population sampling. Given a reasonable chance of eliminating the populations of undesirable species, the beneficial effects should be noticeable one-two years post treatment.

IV. RESOURCE IMPACTS:

- The populations of the target species, common carp and yellow perch, along with all other fish species inhabiting the lake will be severely and negatively impacted. All are exotic species. To the extent possible, largemouth bass will be collected and held at the RMH until the rehabilitation is completed and the effects of the rotenone has dissipated; then returned to the lake.
- Regional Lands, Habitat, Wildlife and Non Game managers have been appraised of our rehabilitation plans. No unmitigated concerns have been expressed on the potential impacts to non targeted species.

- According to Bradbury (1986), the effects of rotenone on benthos are variable, depending on the concentrations and species. Crustaceans are most tolerant while the smaller insects are most affected. Immediate reduction of populations averages 25%, and survival doubles when access to bottom sediments exists. Benthic communities generally recover to at least pretreatment levels within two months. Zooplankton is more severely impacted, and communities generally take two to twelve months to fully recover. While relatively tolerant of even heavy doses of rotenone, amphibians (especially larval) are at risk, and herptiles are affected somewhat less so. Almost no chance of eliminating an entire population exists.
- This lake has seen very limited angler use in recent years. The lake will be closed to angling during the planned period of treatment but will reopen to the public by Summer 2009. The rehabilitation is planned for March 2009 when all applicable hunting seasons will be closed in this area. The lake proper is not a source of potable water for humans or livestock.
- Professional biologists and other naturalists have visited this site frequently over the past 10 years. To our knowledge, no endemic, rare, threatened or otherwise listed species will be impacted by the rehabilitation. In addition, a WDFW Warm Water Survey was conducted in 2005 and no State listed aquatic species were collected within the lake.
- The water in the lake is used for irrigation from late Spring to the Fall. Rehabilitation is scheduled for March 2009 prior to the irrigation season. In addition, the water level of the lake will be lowered to ensure that water will not exit the lake through the irrigation canal during the treatment period. Dead fish along the shoreline will not be a public nuisance since the lake will be closed to fishing and there are no shoreline residents.

V. MITIGATING FOR ADVERSE IMPACTS:

- Catchable-sized fish will be returned to the lake to the extent possible after treatment. There will be only a limited loss of recreational fishing immediately after treatment with a gradual improvement in following years as the fish mature. No removal of dead fish is planned as the nutrient base contained therein is best returned to the lake.
- Early spring rehabilitation (March) should not interfere with waterfowl nesting.
- Livestock does not use the waters to be treated and irrigation withdrawals will not be affected at this time of the year. The concentration of rotenone used in the treatment will be far below that considered harmful to mammals.
- Downstream resources will not need to be protected, as those waters will not be affected under the planned application. Inflows to the lake are at their lowest in March and the lake will be lowered to the minimum level. Weir boards will be placed in the water control structure to further delay the movement of water downstream. This combination of preventative measures will ensure that there is no outflow from the lake during the treatment period.

- No endemic, rare, threatened or otherwise listed species are known to inhabit this area.
- Protective wear for the eyes, face and hands will be available for all purveyors of rotenone.
- Lakes will be posted according to Department of Ecology guidelines to notify the public of the treatment and discourage the public from possessing or consuming dead fish.

VI. RECREATIONAL IMPACT:

Recreational angling opportunity will be increased if the undesirable species are removed from Worth Lake. These recreational opportunities are invaluable for the local rural communities. With the planting and maturation of largemouth bass and bluegill, Worth Lake is estimated to host 10-20 angler trips per week during the usual angling season. The level of participation will continue at minimal levels providing only marginal recreational benefits if no action is taken.

VII. ECONOMIC IMPACTS:

- Rehabilitation would establish a fishery in a rural area providing associated economic activity for Basin City, Mesa, Eltopia, and the Tri-cities. An estimated 300 angler trips will be made to Worth Lake as a result of the proposed management action, with an economic impact ranging from \$15,840 to \$39,600 per year (2004 dollars; based on WDW estimate of \$132 per trip). Fingerling and adult plants will cost the agency less than \$1,000, and can be easily accomplished under current hatchery programs.
- The cost of treatment will be approximately \$4,000, but the subsequent boost to the local economy will more than offset that loss within two-to-three years after treatment.
- Developing a local broodstock for the Ringold Meseberg Hatchery would greatly reduce costs for collection and transportation of broodstock from other sites and provide a local lake for the disposition of the fish after spawning.

VIII. RELATED MANAGEMENT ACTION:

Approximately 25 catchable (>10") largemouth bass and 250 catchable bluegill will be stocked in late spring to provide immediate fishing opportunity with a follow up of 1,200 fingerling (2"-4") largemouth bass and 4,800 fingerling bluegill (2"-4") in the fall. It is expected that the population will be self-sustaining after the initial plants. The lake will be surveyed to monitor fish population growth and abundance.

IX. PUBLIC CONTACT:

Public concern over the lack of quality warm water fisheries, especially bluegill, largemouth bass, and crappie, prompted this action.

Public meetings will be held during July 2008 in Ephrata, Tri-cities, Spokane, Prosser, and Olympia to explain DFW's 2007-08 rehabilitation proposals, assess public opinion, and address local concerns. The announcement was provided statewide and to area papers and radio stations and mailed to landowners and residents near the lakes.

Comments on the SEPA for rehabilitations statewide will also be accepted during the month of August. The SEPA can be found on WDFW or WA Dept of Ecology's web sites, or at County offices (usually Planning Commission). Additional comments may be sent directly to WDFW via mail or e-mail.

Initiated by: Region Two Fisheries Management

LAKE MANAGEMENT PLANS

updated June, 2008 - J.W. Korth

Waters: Canal Chain - June, Lois, Virgin, North North Windmill, North Windmill, Windmill, Canal, Pit, and Heart lakes

Location: Seep Lakes Wildlife Area, Sec 21, 22, 27, 28, and 33, T17N, R29E; approximately 7 miles north of Othello and 6 miles southeast of the southeast corner of Potholes Reservoir, Grant County, WA

	Size:	Maximum Depth:
June	11 acres	40 feet
Lois	? acres	? feet
Virgin	20 acres	? feet
N.N.Windmill	4 acres	30 feet
N.Windmill	20 acres	50 feet
Windmill	37 acres	60 feet
Canal	92 acres	130 feet
Pit	23 acres	30 feet
Heart	26 acres	64 feet

Water Source: subsurface seepage springs

Outflow: 5-10 cfs to North Teal Lake (Sec 32, T17N, R29E)

Management History:

The June, Lois, Virgin, North North Windmill, North Windmill, Windmill, Canal, Heart, and Pit chain of lakes lie southeast of O'Sullivan Dam and Potholes Reservoir. These waters have been popular trout fisheries since the 1960s when opening day-type seasons were in effect. Heart Lake is normally isolated, but at times Canal Lake overflows into Heart Lake and species mixing occurs. The three upper lakes, June, North North Windmill, and North Windmill, are protected from upstream migration by an impassable falls below North Windmill Lake. Two additional waters above North North Windmill Lake, Lois and Virgin lakes, are also isolated by an impassable falls at Virgin Lake's outlet.

Contamination by spiny-ray species is the largest obstacle to managing these waters as trout fisheries. Undesirable species usually appear with illegal assistance from anglers. Six rehabilitations have been done on Windmill and Canal lakes, the largest waters in this system. The smaller surrounding lakes have been treated fewer times. Virgin and Lois lakes are far enough removed from the system to dissuade illegal stocking and have never needed rehabilitation. The earlier rehabilitations targeted illegally introduced crappie, although perch, sunfish, bullhead catfish, and even carp were also eradicated at one time or another. Crappie persisted, or were continually and illegally introduced, through four rehabilitations, including two with toxophene. They were no longer present after the 1987 rehabilitation. Pumpkinseed sunfish

have been persistent since the early 1980s, and the last three rehabilitations have failed to eradicate this species. Perch were also illegally introduced into Heart Lake during the late 1980s. Lake rehabilitation has provided at least 4-6 years of good trout fishing after each treatment.

Since the late 1980s, a relatively new management issue for this water has been the increasing number of piscivorous birds frequenting the area. Cormorants and mergansers have become spring breeders and summertime residents. While no uncontested proof of damage to the fishery exists, these species are primarily fish eaters. It is suspected that many of the unpredictable and unexplainable failures of the fisheries, which occur periodically in most of the smaller lakes in the area, could be attributable to predation from these avian species.

Stocking levels for June, Lois, Virgin, North North Windmill, North Windmill, Windmill, Canal, Pit, and Heart lakes have hovered around 80,000 rainbow trout. In early years these waters were very productive and yielded 4-10 trout per trip. In 1969, rainbow fry stocked at less than one inch long (210/lb) in April grew to 7.5-9.5 inches by July.

T&E Flora and Fauna: Professionals from many resource fields have visited this site countless times during the last 40 years. No known report exists of any threatened or endangered species habitually found in or near these lakes. Occasional visits from both bald and golden eagles occur, although no nests of these two species are known in the area. Protected species of waterfowl and other birds frequently are found here at times, as well.

June, Lois, Virgin, North North Windmill, North Windmill, Windmill, Canal, Pit, and Heart lakes are currently open to angling year-round reducing the opening day crowds in favor of prolonged and steady angling pressure. The catch limit is five fish, and bait is allowed. Boating access is available at Windmill, Canal, and Heart lakes, while anglers must walk into the remaining smaller lakes. Expanding populations of sunfish, perch, and possibly other illegally introduced species are competing with trout fry and depressing trout survival. Anglers rarely pursue sunfish, and the perch fishery is a relatively small affair. The present fishery is a shadow of the former rainbow fisheries, which can occur there in the absence of competing fish species.

Current Management Objectives:

Year around, low-key, production type fishery. Five fish limit, no size or gear restrictions. Provide 3 yearling rainbow trout per angler trip for 1-5,000 anglers per season.

1. Fishery Objectives:

<u>Species</u>	<u>Type</u>	<u>Category</u>	<u>Number of Fish</u>		<u>Avg. Size</u>	<u>Exploit.</u>
			<u>/hour</u>	<u>/Angler</u>		<u>Rate</u>
Rainbow	Prod	Year Around	2	3	12 inches	90% 1-yr-olds

2. Angler use objective (# angler days): Season - 1,000-5,000

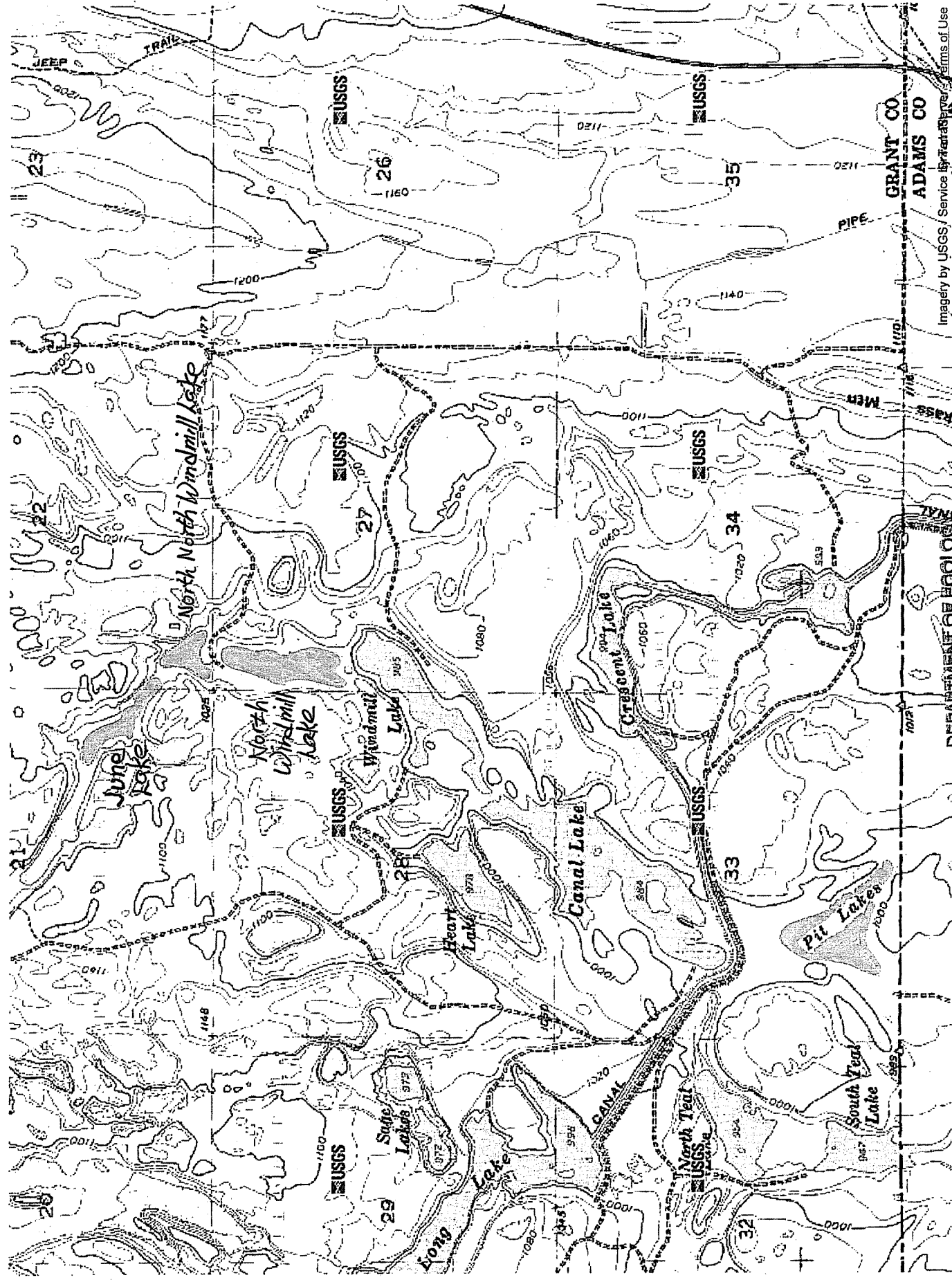
3. Stocking Objectives:

<u>Lake</u>	<u>Species</u>	<u>Number of Fish Stocked</u>			<u>Planting Month</u>
		<u>Total</u>	<u>/Acre</u>	<u>/pound</u>	
June	Rainbow	2,000	180	<80	April-May
Lois	Rainbow	2,000	?	<80	April-May
Virgin	Rainbow	5,000	250	<80	April-May
NN Windmill	Rainbow	1,000	250	<80	April-May
N Windmill	Rainbow	10,000	500	<80	April-May
Windmill	Rainbow	15,000	400	<80	April-May
Canal	Rainbow	35,000	380	<80	April-May
Pit	Rainbow	5,000	220	<80	April-May
Heart	Rainbow	6,000	230	<80	April-May

E. Management Strategy:

- Plant rainbow fry in spring.
- Check yearling growth; should be about 12 inches, adjust stocking rate as necessary.
- Harvest 90% of yearling fish by end of season.
- Monitor all fish species periodically by electrofishing or netting.
- Substitute fall fingerlings for at least a portion of the spring fry when competing species begin to impact trout fry survival.
- Control spiny-ray species with rotenone when trout survival is inadequate to produce an acceptable fishery.

CANAL CHAIN OF LAKES, GRANT CO.



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DEPARTMENT OF ECOLOGY

WATER TREATMENT PLANT

UNIT 101

DEPARTMENT OF WATER



PRE-REHABILITATION PLAN

**Canal, Windmill, Heart, North Windmill,
North North Windmill, June, North Teal, and Pit Lakes**

I. PROPOSAL

A. Justification for Proposed Rehabilitation

The Canal, Heart, Windmill, North Windmill, North North Windmill, June, North Teal, and Pit chain of lakes lie southeast of O'Sullivan Dam and Potholes Reservoir. These waters have been popular trout fisheries since the 1950s, averaging 4-10 fish per angler when opening day-type seasons were in effect. The lakes are currently open to angling year-round, reducing the opening day crowds in favor of prolonged and steady angling pressure. Expanding populations of spiny-ray fishes are competing with trout fry and depressing trout survival. Anglers rarely pursue sunfish, and the other fisheries are little attended probably due to the diminutive size of the pursued. The present fishery is a shadow of the former rainbow fisheries that can occur there. The last treatment of these waters was 11 years ago.

Seven rehabilitations (1959, '68, '75, '82, '87, '90, and '97) have been done on Canal and Windmill, the largest and uppermost waters in this drainage. Heart Lake was most often isolated, although Canal Lake sometimes overflows into Heart Lake, and has only been treated four times (1959, '87, '90, and '97). An impassable barrier to upstream fish migration separates Canal from the smaller northern Windmills and June, which have also been treated fewer times (1975, '90, and '97). Pit Lake has been more problematic and has been treated eight times (1960, '63, '68, '72, '75, '80, '90, and '97). Two additional waters in the drainage, Virgin and Lois lakes, are separated by an impassable barrier and are too distant for illegal stocking to occur. These two waters have never needed rehabilitation and are not further addressed in this proposal.

The earliest rehabilitations targeted illegally introduced crappie, although perch, sunfish, bullheads, and carp have also been targeted in the past. Crappie persisted or were continually re-introduced through four rehabs including two with toxophene. They were not present after the 1987 rehabilitation. Pumpkinseed sunfish appeared in all these waters in the early 1980s and the last four rehabs have failed to eradicate them. Perch were also illegally introduced into Heart Lake in the 1980s and were present in Windmill and Canal during the last treatment. It is primarily the latter two species, sunfish and perch, that currently depress trout fry survival in Canal, Heart, Windmill, North Windmill, North North Windmill, and June lakes, although other species such as bass have probably also been introduced more recently.

Lake rehabilitation has provided 4-6 years of very good trout fishing after each treatment. Thereafter, trout survival begins to diminish and the fishery becomes less attractive over time. After 7-8 years, the trout fishery is almost non-existent. Since the last treatment, the proposed rehabilitation will entail superior techniques and equipment not available during previous rehabilitation attempts. Powdered rotenone will be slurried before application to the lake, providing a better distribution of the toxicant. Rehabilitation is desirable during the fall as the springs that feed these lakes will be at their lowest flow. This should reduce the amount of

sanctuary available to the target species during treatment. Fall treatment is also planned due to the early spawning of yellow perch. Sunfish spawning should be much diminished by fall. Submergent aquatic weed growth may present a problem during fall rehabilitations.

Alternatives to rehabilitation are costly or impractical. Stocking catchable sized fish cost almost ten times the cost of a fry plant, and Region Two lacks the hatchery space and water to institute a catchable fish stocking program. Optimistic estimates of survival of 4-6 inch advanced fry in larger mixed species waters range from 10-20 percent. Spring fry survival in lakes free of competing species ranges from 50-80 percent. It has been 11 years since the last treatment of these lakes, and angling has virtually halted in these lakes. WDFW policy states that lake rehabilitation is an option for eliminating illegally planted fish to restore the intended management scheme.

B. Physical Description of Water Proposed for Rehabilitation

1. WATER: June Lake

2. LOCATION: Sec 21, 22, T17N, R29E Grant Co.
3. SURFACE ACRES: 10.8 MAXIMUM DEPTH: 40 feet
4. VOLUME: 156.0 acre feet; 424,020,464 lbs. H₂O
5. INLET STREAM: subterranean flow.
6. OUTLET STREAM: perennial, small creek (200 ft., 2-3 cfs) drains to N.N. Windmill Lake.
7. PUBLIC ACCESS: Entire Lake, walk in only, no facilities.
8. LAND OWNERSHIP: Public 100%
9. ESTABLISHED RESORTS: None on lake; a resort and state park near-by (Potholes Res.)

1. WATER: North North Windmill Lake

2. LOCATION: Sec 22, T17N, R29E Grant Co.
3. SURFACE ACRES: 3.8 MAXIMUM DEPTH: 30 feet
4. VOLUME: 44.4 acre feet; 120,685,594 lbs. H₂O
5. INLET STREAM: perennial, small creek from June and perennial, small creek from Virgin.
6. OUTLET STREAM: perennial, small creek (600 ft., 2-3 cfs) drains to N. Windmill Lake.
7. PUBLIC ACCESS: Entire Lake, walk in only, no facilities.
8. LAND OWNERSHIP: Public 100%
9. ESTABLISHED RESORTS: None on lake; a resort and state park near-by (Potholes Res.)

1. WATER: North Windmill Lake

2. LOCATION: Sec 27, T17N, R29E Grant Co.
3. SURFACE ACRES: 20.2 MAXIMUM DEPTH: 50 feet
4. VOLUME: 341.6 acre feet; 928,517,990 lbs. H₂O
5. INLET STREAM: perennial, small creek from N.N. Windmill.
6. OUTLET STREAM: perennial, small creek (50 ft., 2-3 cfs) drains to Windmill Lake; includes barrier (60^{ft} falls) to upstream fish migration.
7. PUBLIC ACCESS: Entire Lake, walk in only, no facilities.
8. LAND OWNERSHIP: Private 100% Hampton Farms
9. ESTABLISHED RESORTS: None on lake; a resort and state park near-by (Potholes Res.)

1. WATER: Windmill Lake

2. LOCATION: Sec 27, 28, T17N, R29E Grant Co.
3. SURFACE ACRES: 37.4 MAXIMUM DEPTH: 60 feet
4. VOLUME: 1,073.7 acre feet; 2,918,471,213 lbs. H₂O
5. INLET STREAM: perennial, small creek from N. Windmill.
6. OUTLET STREAM: Permanent, open connection to Canal Lake. .
7. PUBLIC ACCESS: Entire Lake, w/ parking, launch, toilets, handicapped access.
8. LAND OWNERSHIP: PUBLIC 50%, PRIVATE 50 % Hampton Farms
9. ESTABLISHED RESORTS: None on lake; a resort and state park near-by (Potholes Res.)

1. WATER: Heart Lake

2. LOCATION: Sec 28, T17N, R29E Grant Co.
3. SURFACE ACRES: 26.4 MAXIMUM DEPTH: 64 feet
4. VOLUME: 884.8 acre feet; 2,405,013,811 lbs. H₂O
5. INLET STREAM: None
6. OUTLET STREAM: None; occasional connection to Canal Lake during high water.
7. PUBLIC ACCESS: Entire Lake, w/ parking, launch, toilets, handicapped access.
8. LAND OWNERSHIP: PUBLIC 100%
9. ESTABLISHED RESORTS: None on lake; a resort and state park near-by (Potholes Res.)

1. WATER: Canal Lake

2. LOCATION: Sec 28, 33, T17N, R29E Grant Co.
3. SURFACE ACRES: 92.2 MAXIMUM DEPTH: 130 feet
4. VOLUME: 1,960.2 acre feet; 5,328,105,869 lbs. H₂O
5. INLET STREAM: Permanent, open connection to Windmill Lake.
6. OUTLET STREAM: Permanent, small stream (300 ft, 3-5 cfs) to Pit and N. Teal lakes; includes semi-barrier (45° falls) to upstream fish migration from N. Teal.
7. PUBLIC ACCESS: Entire Lake, w/ parking, launch, toilets, handicapped access.
8. LAND OWNERSHIP: PUBLIC 100%
9. ESTABLISHED RESORTS: None on lake; a resort and state park near-by (Potholes Res.)

1. WATER: Pit Lake

2. LOCATION: Sec 33, T17N, R29E Grant Co.
3. SURFACE ACRES: 22.8 MAXIMUM DEPTH: 30 feet
4. VOLUME: 186.5 acre feet; 506,933,856 lbs. H₂O
5. INLET STREAM: Permanent, small stream (100 ft, 3-5 cfs) from Canal Lake.
6. OUTLET STREAM: Permanent, small stream (200 ft, 3-5 cfs) to N. Teal lakes; includes semi-barrier (45° falls) to upstream fish migration from N. Teal.
7. PUBLIC ACCESS: Entire Lake, walk in only, no facilities.
8. LAND OWNERSHIP: PUBLIC 100%
9. ESTABLISHED RESORTS: None on lake; a resort and state park near-by (Potholes Res.)

1. WATER: North Teal Lake

2. LOCATION: Sec 32, T17N, R29E Grant Co.
3. SURFACE ACRES: 20.7 MAXIMUM DEPTH: 40 feet
4. VOLUME: 344.7 acre feet; 936,944,237 lbs. H₂O

5. INLET STREAM: Permanent, small stream from Canal and Pit Lakes.
6. OUTLET STREAM: Permanent, small stream (300 ft, 3-5 cfs) to S. Teal lakes; includes semi-barrier (gabion) to upstream fish migration from S. Teal.
7. PUBLIC ACCESS: Entire Lake, parking, no facilities.
8. LAND OWNERSHIP: PUBLIC 100% on Columbia National Wildlife Refuge
9. ESTABLISHED RESORTS: None on lake; a resort and state park near-by (Potholes Res.)

C. Proposed Management Actions

1. WATER: **June Lake**
2. TARGET SPECIES: pumpkinseed sunfish
3. DATE LAST REHABED: 15-16 October, 1997
4. PROPOSED TREATMENT DATE: September-November, 2008
5. REPLANTING DATE: Spring 2009
6. SPECIES: rainbow trout
7. CATCHABLES: 0 FRY: 2,000
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 1 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 420 lbs., 10 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/ATV spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth Personnel ~1-2

1. WATER: **North North Windmill Lake**
2. TARGET SPECIES: pumpkinseed sunfish
3. DATE LAST REHABED: 15-16 October, 1997
4. PROPOSED TREATMENT DATE: September-November, 2008
5. REPLANTING DATE: Spring 2009
6. SPECIES: rainbow trout
7. CATCHABLES: 0 FRY: 1,000
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 1 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 120 lbs., 10 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/ATV spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth Personnel ~1-2

1. WATER: **North Windmill Lake**
2. TARGET SPECIES: pumpkinseed sunfish
3. DATE LAST REHABED: 16,18 October, 1997
4. PROPOSED TREATMENT DATE: September-November, 2008
5. REPLANTING DATE: Spring 2009
6. SPECIES: rainbow trout
7. CATCHABLES: 0 FRY: 5,000
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 1 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 921 lbs., 10 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/ATV spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth Personnel ~1-2

1. WATER: **Windmill Lake**
2. TARGET SPECIES: pumpkinseed sunfish, carp (possible from N. Teal)
3. DATE LAST REHABED: 28,30 October, 1997
4. PROPOSED TREATMENT DATE: September-November, 2008
5. REPLANTING DATE: Spring 2009
6. SPECIES: rainbow trout
7. CATCHABLES: 10,000 FRY: 15,000
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 2 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 5,788 lbs., 5 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/ATV spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth Personnel ~ 4-6

1. WATER: **Canal Lake**
2. TARGET SPECIES: pumpkinseed sunfish, carp (possible from N. Teal)
3. DATE LAST REHABED: 28,30 October, 1997
4. PROPOSED TREATMENT DATE: September-November, 2008
5. REPLANTING DATE: Spring 2009
6. SPECIES: rainbow trout
7. CATCHABLES: 20,000 FRY: 35,000
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 2 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 10,566 lbs., 10 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/ATV spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth Personnel ~ 4-6

1. WATER: **Heart Lake**
2. TARGET SPECIES: pumpkinseed sunfish
3. DATE LAST REHABED: 28,30 October, 1997
4. PROPOSED TREATMENT DATE: September-November, 2008
5. REPLANTING DATE: Spring 2009
6. SPECIES: rainbow trout
7. CATCHABLES: 5,000 FRY: 6,000
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 1 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 2,385 lbs., 5 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/ATV spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth Personnel ~2-4

1. WATER: **Pit Lake**
2. TARGET SPECIES: pumpkinseed sunfish, carp (possible from N. Teal)
3. DATE LAST REHABED: 12-14 November, 1997
4. PROPOSED TREATMENT DATE: September-November, 2008
5. REPLANTING DATE: Spring 2009
6. SPECIES: rainbow trout
7. CATCHABLES: 0 FRY: 5,000
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 2 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 1,005 lbs., 20 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/ATV spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth Personnel ~ 2-4

1. WATER: North Teal Lake
2. TARGET SPECIES: pumpkinseed sunfish, carp
3. DATE LAST REHABED: 12-14 November, 1997
4. PROPOSED TREATMENT DATE: September-November, 2008
5. REPLANTING DATE: Spring 2009
6. SPECIES: rainbow trout
7. CATCHABLES: 0 FRY: 5,000
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: <2 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): none additional other than treated water from Canal and Pit lake.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/ATV spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth

Note: Pit Lake may not be treated, depending on water level conditions and connectivity to Canal Lake. North Teal Lake will not be treated and is listed as a holding area for treated water from Canal and possibly Pit lakes. No outflow from North Teal Lake is expected.

Total Toxicant (ROTENONE AT 5% ACT. INGRED) = 21,205 lbs and 70 gal.

II. PURPOSE:

The Washington Department of Fish and Wildlife (DFW) provides many types of fisheries in response to public desires. DFW manages both trout and warmwater recreational fisheries based on many different species of fish and levels of difficulty. Public demand for and participation in trout fisheries is very high. These fisheries are prized as opportunities for families to recreate together as well as providing an appropriate challenge for occasional or novice anglers. Year around season trout fisheries provide a relaxed recreational opportunity and are also integral to the state and many local economies.

June, North North Windmill, North Windmill, Windmill, Canal, and Heart lakes have a long history of being managed as trout fisheries. Management intends to return these lakes to trout fisheries, as per the Management Plans established over 20 years ago. Only the complete rehabilitation or the stocking of catchable-sized fish can restore the trout fishery in these waters now. Rehabilitation will eliminate or drastically reduce interspecific competition and allow the trout fisheries to flourish. The cost of annually stocking of catchable-sized trout and creating a mixed species fishery would be an order of magnitude greater for the larger trout necessary to attract anglers. Without a very significant financial investment, current resources are not available to provide catchable-sized trout on a regular basis without severely impacting hatchery production for many other fisheries. Managing these waters as warmwater fisheries will not create the same amount of recreation, as evidenced by the decline in participation as the trout fishery ebbs.

III. INTENDED OUTCOME/MEASURE OF SUCCESS:

DFW intends to restore June, North North Windmill, North Windmill, Windmill, Canal, and Heart lakes to popular, easily accessible trout fisheries based on fingerling-stocked trout. The

average catch rates should be at least two to three 10-12 inch trout per angler. Success will be apparent as angler participation increases and will be measured during random creel contacts and biological surveys. Given a reasonable chance of reducing the populations of undesirable species dramatically, the beneficial effects should last approximately 6 to 8 years under current management schemes. In addition to reasons listed under Resource, Recreational and Economic Impacts, to abandon these lakes as trout fisheries is to invite other incursions across the state.

IV. RESOURCE IMPACTS:

1. The populations of the target species, pumpkinseed sunfish and possibly others, will be severely and negatively impacted. All are exotic species.
2. Regional Lands, Habitat, Wildlife and Non-Game managers have been appraised of our rehabilitation plans. No unmitigated concerns have been expressed on the potential impacts to non-targeted species.
3. According to Bradbury (1986), the effects of rotenone on benthos are variable, depending on the concentrations and species. Crustaceans are most tolerant while the smaller insects are most affected. Immediate reduction of populations averages 25%, and survival doubles when access to bottom sediments exists. Benthic communities generally recover to at least pretreatment levels within two months. Zooplankton is more severely impacted, and communities generally take two to twelve months to fully recover. While relatively tolerant of even heavy doses of rotenone, amphibians (especially larval) are at risk, and herptiles are affected somewhat less so. Almost no chance of eliminating an entire population exists.
4. Loss of the following year's fishery will occur for June, North North Windmill, and North Windmill will probably occur due to lack of sufficient numbers of catchable-sized fish in the spring. Fingerlings will be stocked and the fishery will begin again one year after treatment. Hunting will be curtailed during the treatment (about 2-4 days). The lakes will be closed to angling, and other recreational uses such as boating, and swimming will be curtailed during the planned period of treatment. These waters are not a source of potable water for humans. A portion of the waters treated are sources of drinking water for livestock. Levels of rotenone used in the treatment will be too low to adversely affect the livestock.
5. Professional biologists and other naturalists have visited this site frequently over the past 40 years. To our knowledge, no endemic, rare, threatened or otherwise listed species will be impacted by the rehabilitation.

V. MITIGATING FOR ADVERSE IMPACTS:

1. Provided catchable-sized fish are available the following spring, no loss of recreational fishing time will occur for Windmill, Canal, and Heart lakes. Trout fry survival and growth will be greatly enhanced, and future trout fisheries will attain their previous status. No removal of dead fish is planned as the nutrient base contained therein is best returned to the lake.

Livestock use of the waters to be treated will not be significantly affected. The concentration of rotenone used in the treatment will be far below that considered harmful to mammals. The landowners will be notified of the rehabilitation and consequent exposure of livestock to rotenone.

Fall rehabilitation will not interfere with waterfowl spring nesting. The eradication of spiny-ray fishes would also benefit waterfowl through increased production of invertebrates. Stocked populations of trout will not be anywhere near as numerous as the current spiny-ray population.

2. Downstream resources will not need to be protected as those waters are infested with carp and any secondary kill ensuing in that area would also be beneficial to waterfowl production. Rehabilitation of these downstream waters will be proposed in the near future.

3. No endemic, rare, threatened or otherwise listed species are known to inhabit this area.

4. Protective wear for the eyes, face and hands will be available for all purveyors of rotenone.

5. Lakes will be posted according to Department of Ecology guidelines to notify the public of the treatment and discourage the public from possessing or consuming dead fish.

VI. RECREATIONAL IMPACT: ALSO SEE PROPOSAL I.A, above.

Recreational opportunity will be increased. When free of competing species, these lakes are estimated to host a minimum of 20-30 angler trips per week during the usual angling season, accounting for at least 1,000 recreation-days per year. The lakes could conservatively sustain five times that amount of pressure at the anticipated levels of success.

Angler success should reach three to five fish per trip. Yearling trout should average about 11 inches. Carryovers should be expected to be about 10% of the catch and average 15 inches for 2-year-olds and 18 inches for 3-year-olds.

VII. ECONOMIC IMPACTS:

An estimated 1,000 trips made to these lakes as a result of the proposed management action would result in an increased economic impact totaling \$37,790 per year (1991 dollars; based WDW estimate of \$37.90 per trip). If used to its full potential, the annual value could be over \$200,000 to the state's economy. The fishery as it now exists generates maybe \$5,000 per year. Rehabilitation would bring back the fishery and associated economic activity.

The total annual cost to plant these lakes is less than \$3,500. The rehabilitation will cost the Department about \$45,000 (including costs of rotenone, time, travel). Even if rehabilitations occur once every five years (rather than the current 10 years), the cost of fry plants (5 yrs.) and the rehab totals \$62,800. The cost of stocking enough catchable-sized trout to create the same fishery, if this were possible (see IA), would be at least \$100,000 for this five year period. The fishery produced during this five years is worth at least \$150,000 and as much as \$1,000,000 to the state's economy, depending on participation. Without action, the fishery is currently worth \$25,000 or less per five years.

Estimates for the cost of the enforcement action necessary to curtail the activity of the individuals responsible for illegal fish plants are not available. However, this cost might be looked upon as a statewide expenditure since some preventive benefit would certainly occur as perpetrators find out the Department takes illegal transport and planting of fish very seriously.

VIII. RELATED MANAGEMENT ACTION:

See I.C.6., above, for fish planting data.

Increased penalties and enforcement activities are desirable if WDFW is ever going to dissuade illegal stocking of state managed waters. Educating the public about the costs in Department dollars and time with emphasis on what WDFW might be able to accomplish with those resources would be a very worthwhile activity for WDFW Public Affairs. This may result in stemming recruitment to this ill-advised group and turning local opinion against the offenders.

IX. PUBLIC CONTACT:

A public hearing will be held in July 2008 to explain Region Two 2008-09 rehabilitation proposals, assess public opinion, and address local concerns. The announcement will be provided to area papers and radio stations at least a week in advance of the meeting. With many of the lakes' users living outside Grant County, actual percentages pro and con are difficult to obtain. Public support may be best judged by the number of participants in the fishery (vis-à-vis Recreational Impacts).

Initiated by: Region Two Fisheries Management

LAKE MANAGEMENT PLANS

Updated March, 2008 - J.W. Korth, L.E. Cooke, and J. Tabor

Waters: Desert Lakes and Ponds (TD – 02 wetland enhancement area)

Location: Desert Wildlife Area, Sections 27, 36, T18N, R26E; Sec. 31, T18N, R27E; and Sec. 6, T17N, R27E; approximately 18-22 miles south of Ephrata and 12 miles southwest of Moses Lake, Grant County, WA

Waters:	Size (acres):	Max Depth (ft):	Volume (acre feet):
Wildlife Ponds	21 total	6 feet	115
(16 ponds total)	1-3 acres each		
Aztec	3	15	25
Desert	42	15	195
N. Desert	3	15	25
Dune	8	15	70
Harris	39	20	353
Lizard	3	15	25
Meadowlark	3	15	25
Sedge	9	15	85
Tern	8	15	70

OUTLET: None. Natural and man-made dikes separate waters in the proposed treatment area from the adjacent Lakes and Winchester Wasteway.

INLET: None. **Water Source:** Seep from the adjacent Desert Lakes and Winchester Wasteway.

Wildlife –

Management History: The waters proposed for treatment are several ponds (4 ponds) adjacent to the Desert Lakes (Desert, Harris, Dune, Sedge, and Tern). The enhanced project waters include 16 small ponds, and are herein referred to as the Desert Wildlife Ponds (TD-02), located within the Desert Wildlife Area. Surface waters in the treatment area are isolated from the adjacent lakes (Desert, Harris, Dune, Sedge, and Tern) and Winchester Wasteway by dikes. The purpose of the dikes is to allow management of individual waters for enhanced spring waterfowl production, summer brood rearing and molting habitat, and fall waterfowl hunting opportunities. The Desert Lakes are larger bodies of water that are managed for enhanced fishing opportunities. Management activities within the Desert Lake Ponds (TD-02) to date consist of excavation of wetland cells, creation of fish barriers by dikes, protection of dikes by armoring with chain link, and reseeding of disturbed areas with appropriate grass mixes. The use of rotenone in approximately 25 % of the project area will remove undesirable fish species that compete with waterfowl and other wildlife for aquatic foods.

All water proposed for treatment is within the Desert Lake Ponds (TD-02). Enhanced wetlands within the project waters will provide nesting and feeding habitat for a multitude of species. During the fall, quality waterfowl hunting opportunities will be provided to those that make the long trek into the area. Quality fishing opportunities will be maintained in the surrounding Desert Lakes.

In addition to the use by waterfowl during the hunting season, the Desert Lakes is used heavily during other periods of the year and by a wide variety of wildlife species.

Another one of the more significant wildlife uses of the Desert Lakes is by breeding and molting ducks. In other parts of the Desert (e.g., The North Potholes Reserve), breeding and molting duck use increased dramatically after rotenone treatment to remove carp in 1981. Numbers of duck broods and molting adults peaked at very high levels (at least 200-300 broods and 500-1000 molting ducks) in 1985-86, but declined annually to pre-treatment (very low) numbers by summer of 2003. Large numbers of carp were observed in waters of NPR by the mid-1990's.

The focus of wildlife management in the Desert Lakes is to provide enhanced habitat for breeding and molting ducks, enhanced fishing opportunities in surrounding lake, and promote wildlife observation that does not result in negative impact to wildlife use.

T&E Flora and Fauna: Professionals from many resource fields have visited this site countless times during the last 40 years. Use of the area by several wildlife species of concern has been documented. These species include:

- | | |
|----------------------------|---|
| 1) Black Tern | (Federal Species of Concern) |
| 2) Bald Eagle | (State sensitive and Federal Species of Concern) |
| 3) Sagebrush Lizard | (State candidate and Federal Species of Concern) |
| 4) Sage Thrasher | (State candidate) |
| 5) American White Pelican | (State endangered) |
| 6) White-tailed Jackrabbit | (State candidate) |
| 7) Leopard Frog | (State endangered and Federal Species of Concern) |

Current wildlife-related management actions in the Desert Lakes include:

- 1) Minimizing human disturbance during the breeding period for birds and ducks (e.g., no public motorized vehicle access).
- 2) Minimizing human disturbance during the duck molting period in July and August (e.g., no public motorized vehicle access).
- 3) Maintaining high quality winter habitat for ducks and geese during the waterfowl-hunting season (e.g., enforcement presence).

- 4) Maximizing in-water food resources (i.e., invertebrates and submerged aquatic plants) for ducks (e.g., coordinating with Fish Management program for carp removal).
- 5) Promotion of wildlife viewing in a manner that minimizes human disturbance of wildlife.
- 6) Continue management actions to protect dikes and levees from beaver activity (e.g., armoring of dikes).

Fisheries –

Management History:

This series of nine lakes lie just west of Winchester Wasteway. All are extremely rich in nutrients and have been managed for trout fishing since their formation in the 1960's from rising groundwater tables.

Management of these waters has been on a year around season and an allowable catch limit of five fish. These walk-in fisheries require anglers to trek a fourth to a full two miles. These restrictions are required to eliminate instantaneous harvest and to spread angler use over the entire year. This management scheme has been very favorably received by anglers as a quality experience in a setting of rolling, shifting sand dunes and a unique abundance and variety of wildlife and flowering plants. No opening day creel surveys are possible, and angler interviews have been sporadic over the years. However, recreational use data for the Desert Wildlife Management Area has been collected steadily since the late 1970's.

Stocking levels for the Desert lakes have hovered around 26,000 rainbows since 1978. Stocks were originally Spokane Hatchery rainbow, but were switched to the later spawning Eagle Lakes rainbow in 1984 to reduce crowding problems in the Columbia Basin Trout Hatchery. More recently (1994) Tokul Creek Hatchery stocks (also late spawners) have been the choice, not only for these waters, but also for many year around lakes. A gauge of their survival and growth relative to Spokane stock is moot until removal of competing species is accomplished.

In early years these waters yielded 5 - 6 trout per trip and frequent incidence of fish over 2 lbs. As their popularity grew catches settled down to about 3 fish/angler in the 1970s, with a continued catch of large fish 14" - 20". Surveys conducted during 1977 estimated that the majority (42%) of the activity in the Desert Wildlife Management Area was due to fishing. The Area received a total of 4,892 angling trips and yielded a catch of 12,130 trout. The average catch was 2.5 per trip and averaged about 0.6 fish per hour. Sunfish were illegally planted in the mid-1970s and by the 1980s, fishing dropped to average of one fish per angler during the prime early spring fishery.

Rehabilitation records indicate Desert has been rehabbed three times, and Harris has been treated with rotenone twice. The remaining waters have never been rehabilitated.

In conjunction with the State's increasing population, all types of use on the Desert Wildlife Area

have increased dramatically during the last decade. Total angling alone is estimated to average about 15,000 trips per season when these lakes have good fisheries. Yet angling activity as a percentage of the whole has decreased from around 40 percent during the late 1970's to about 30 percent currently of the total use. Once productive enough to be popular with fly fishers and others looking for a quality angling experience, the proposed waters rarely attract those anglers anymore. Gill netting surveys conducted during 1995 and 2007 revealed that small sunfish, bluegill, and bass represented most of the fish life in these lakes. These species entered some waters from Winchester Wasteway before those lakes were isolated. Illegal introductions account for the remaining waters. A few trout were extant in only three of these lakes. Catch rates were about one fish or less per trip. The exception was Desert Lake, which had a good population of largemouth bass ranging in size from 2-4 lbs each. Desert Lake may be excluded from treatment if further surveys confirm a well-balanced population of warmwater fish.

Current Management Objectives:

Continue management of most of these waters for trout. Provide low key, walk-in fishery. Propose regulation change to selective gear rules (no bait, single barbless hook, reduced limits). Manage as quality waters. Stock rainbow, brown, and tiger trout fingerlings each spring. Provide yearling trout of about 14 inches, and catch constitution of 15 - 20 percent age 2+ fish. Investigate possibility of keeping Desert Lake as a quality bass fishery through regulations.

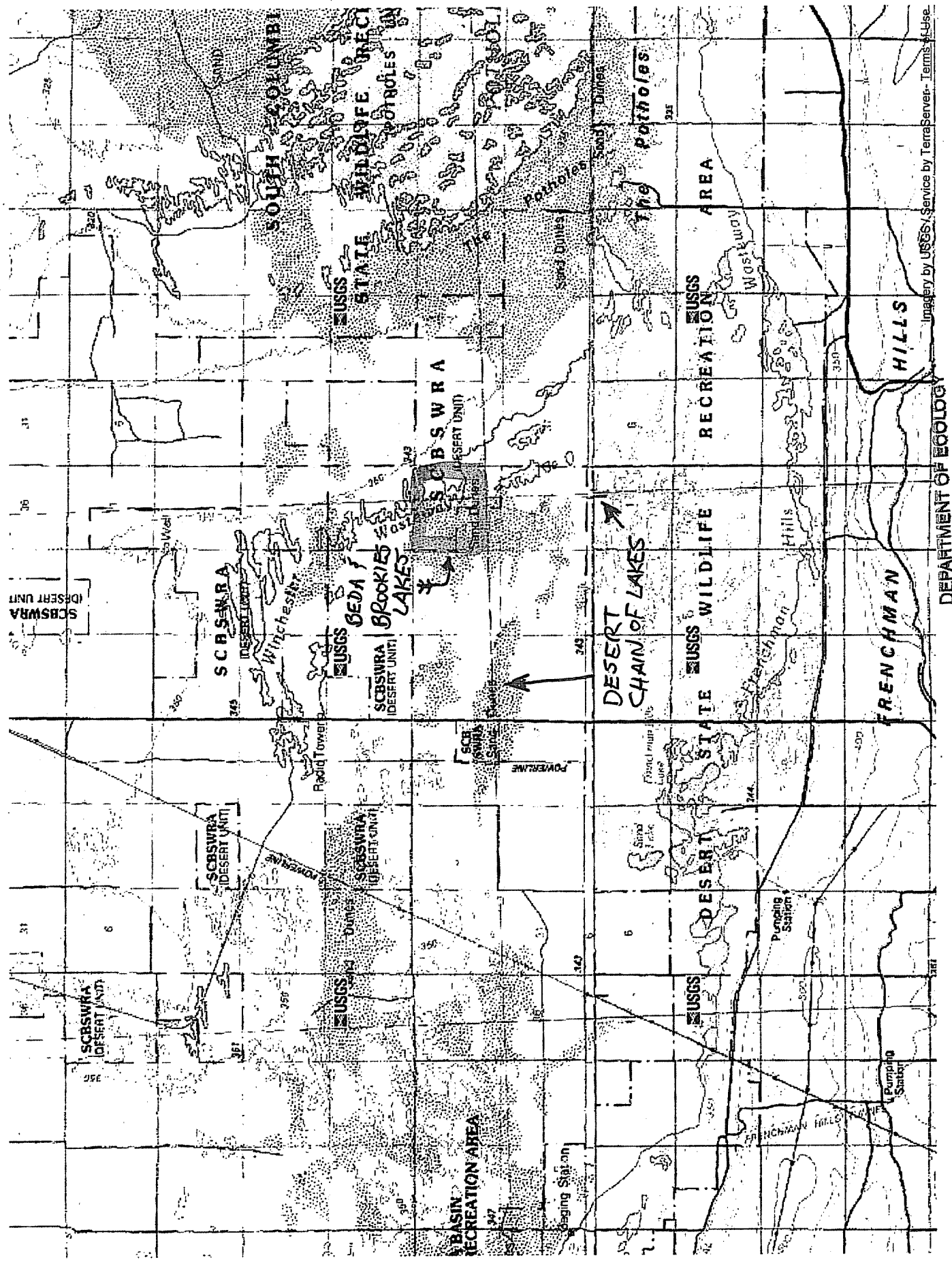
Spot check angler use randomly during the year and assess yearly for presence of non-trout species. Continue rehabilitation with rotenone as soon as possible after detection of unwanted fish species.

Stocking rates; spring planted rainbow fry:

Aztec	300	Lizard	500
Desert	8,000	Meadowlark	500
N. Desert	300	Sedge	2,000
Dune	2,000	Tern	2,000
Harris	10,000		

Management Strategy:

- Plant rainbow fingerlings in spring.
- Check yearling growth; should be about 14 inches, adjust stocking rate as necessary.
- Expect 80% loss of yearling fish by end of year due to harvest and hooking mortality and natural attrition.
- Maintain about 15-20 percent of the catch at age 2+ years old, 16-20+ inch fish.
- Spot check angling activity randomly as time allows.
- Monitor all fish species periodically by electrofishing or netting.
- Control spiny-ray species with rotenone when trout survival is inadequate to produce an acceptable fishery.
- Use of tiger and brown trout as possible temporary controls on sunfish and for diversity.



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PRE-REHABILITATION PLAN

Desert, North Desert, Harris, Dune, Sedge, Tern, Aztec, Meadowlark, and Lizard Lakes and the Desert Wildlife Ponds

(Updated July, 2008 Jeff Korth)

I. PROPOSAL

A. Justification for Proposed Rehabilitation

The Desert Lakes include **Desert, North Desert, Harris, Dune, Sedge, Tern, Aztec, Meadowlark, and Lizard Lakes** and numerous, small unnamed ponds (**Desert Wildlife Ponds**) in the vicinity, west of the Winchester Wasteway. These waters have been popular trout fisheries since their creation in the mid-1960's. These walk-in fisheries attract anglers looking for a 'quality' experience. Seasons extend year around, so no opening day creel surveys have been done, and angler interviews have been sporadic over the years. However, recreational use data for the Desert Wildlife Management Area has been collected since the late 1970's.

During the first years of planting, anglers averaged 5-6 fish per trip. Catch rates settled down to about 3 fish/angler during the early 1970's. Surveys conducted during 1977 estimated that the majority (42%) of the activity in the Desert Wildlife Management Area was due to fishing. The Area received a total of 4,892 angling trips and yielded a catch of 12,130 trout. The average catch was 2.5 per trip and averaged about 0.6 fish per hour, and has since declined substantially.

In conjunction with the State's increasing population, all types of use on the Desert Wildlife Area have increased dramatically during the last decade. Total angling alone is estimated to average about 15,000 trips per season when these lakes have good fisheries. Yet angling activity as a percentage of the whole has decreased from around 40 percent during the late 1970's to about 30 percent currently of the total use. Once productive enough to be popular with fly fishers and others looking for a quality angling experience, the proposed waters rarely attract those anglers anymore. Gill netting surveys conducted during 1995 and 2007 revealed that small sunfish, bluegill, and bass represented most of the fish life in these lakes. These species entered some waters from Winchester Wasteway before those lakes were isolated. Illegal introductions account for the remaining waters. A few trout were extant in only three of these lakes. Catch rates were about one fish or less per trip. The exception was Desert Lake, which had a good population of largemouth bass ranging in size from 2-4 lbs each.

Some progress has been made in reclaiming these trout waters. The largest lake among these waters, Desert Lake, has been rehabilitated several times when first isolated from the Wasteway. The treatment of Harris Lake was completed in 1997, and a very good fishery ensued for about seven years. The smaller waters have only been contaminated through illegal introductions during recent times, and the proposed rehabilitation will be their first. These waters' potential to produce viable game fisheries has been well established in the past. These waters are also under consideration for selective fisheries regulations.

The Desert lakes had been proposed and approved for rehabilitation during 1997-98. High water levels in the spring of 1997 prevented most of the treatments from being carried out, and it was later discovered that new levees would have to be constructed before other remaining waters could be successfully treated. Several excavation and levee projects have since been accomplished, eliminating surface connections between these waters and the Winchester Wasteway that occur during high water periods. This work and the creation of the smaller ponds were done in cooperation of both Wildlife and Fisheries Programs, and accomplished primarily through the use of waterfowl funds. The smaller ponds, collectively called the Desert Wildlife Ponds (TD-02), were created to enhance waterfowl breeding, brood rearing, and molting habitats and to benefit other species that require early succession vegetation. Removal of fish from these waters will increase invertebrate production and enhance food availability for desired aquatic invertebrates, breeding and molting ducks, and other species of wildlife.

An unknown, but very high percentage (estimate 80-90%), of wetlands in the Desert Wildlife Area (DWA) are in a very late stage of succession. Species of animals adapted to a late stage dominate the fauna of the DWA. Species adapted to an early stage of succession are absent from much of the DWA and are continuing to decrease in abundance. The management goal is to restore a more "balanced" wetland obligate fauna in the DWA. Early successional stage wetlands are now rare on the DWA. Ponds within another part of the Desert (North Potholes Reserve) were treated with rotenone in Sept. 1981 to remove undesirable fish species including carp and provide the opportunity for a managed fish population of warm-water (spiny-ray) species to provide a sport fishery. Breeding and molting duck use increased dramatically post-treatment. Numbers of duck broods and molting adults peaked at very high levels in 1985-86 and declined annually to pre-treatment (very low) numbers by summer of 2003. Large numbers of carp were observed in waters of NPR by the mid-1990s. The dominance of carp and pumpkinseed fish is the likely cause of the dramatic decline in observed duck use.

B. Physical Description of Waters Proposed for Rehabilitation

1. WATER: Aztec Lake

2. LOCATION: Sec 27 T18N R26E Grant Co.
3. SURFACE ACRES: 3 MAX. DEPTH: 15
4. VOLUME: 25 acre feet; 67,953,600 lbs water
5. INTLET: none
6. OUTLET: none FLOW (cfs) NA
7. PUBLIC ACCESS: Entire Lake
8. LAND OWNERSHIP: PUBLIC 100%; PRIVATE 0%
9. ESTABLISHED RESORTS: None

1. WATER: Desert Lake

2. LOCATION: Sec 31 T18N R27E Grant Co.
3. SURFACE ACRES: 42 MAX. DEPTH: 15
4. VOLUME: 195 acre feet; 530,038,080 lbs water
5. INTLET: none
6. OUTLET: none FLOW (cfs) NA

7. PUBLIC ACCESS: Entire Lake
8. LAND OWNERSHIP: PUBLIC 100%; PRIVATE 0%
9. ESTABLISHED RESORTS: None

1. WATER: North Desert Lake

2. LOCATION: Sec 31 T18N R27E Grant Co.
3. SURFACE ACRES: 3 MAX. DEPTH: 15
4. VOLUME: 25 acre feet; 67,953,600 lbs water
5. INTLET: none
6. OUTLET: none FLOW (cfs) NA
7. PUBLIC ACCESS: Entire Lake
8. LAND OWNERSHIP: PUBLIC 100%; PRIVATE 0%
9. ESTABLISHED RESORTS: None

1. WATER: Harris Lake

2. LOCATION: Sec 36 T18N R26E Grant Co.
3. SURFACE ACRES: 39 MAX. DEPTH: 20
4. VOLUME: 353 acre feet; 958,961,203 lbs water
5. INTLET: none
6. OUTLET: none FLOW (cfs) NA
7. PUBLIC ACCESS: Entire Lake
8. LAND OWNERSHIP: PUBLIC 100%; PRIVATE 0%
9. ESTABLISHED RESORTS: None

1. WATER: Dune Lake

2. LOCATION: Sec 36 T18N R26E Grant Co.
3. SURFACE ACRES: 8 MAX. DEPTH: 15
4. VOLUME: 70 acre feet; 190,270,080 lbs water
5. INTLET: none
6. OUTLET: none FLOW (cfs) NA
7. PUBLIC ACCESS: Entire Lake
8. LAND OWNERSHIP: PUBLIC 100%; PRIVATE 0%
9. ESTABLISHED RESORTS: None

1. WATER: Lizard Lake

2. LOCATION: Sec 6 T17N R27E Grant Co.
3. SURFACE ACRES: 3 MAX. DEPTH: 15
5. VOLUME: 25 acre feet; 67,953,600 lbs water
5. INTLET: none
6. OUTLET: none FLOW (cfs) NA
7. PUBLIC ACCESS: Entire Lake
8. LAND OWNERSHIP: PUBLIC 100%; PRIVATE 0%
9. ESTABLISHED RESORTS: None

1. WATER: **Meadowlark Lake**
2. LOCATION: Sec 6 T17N R27E Grant Co.
3. SURFACE ACRES: 3 MAX. DEPTH: 15
4. VOLUME: 25 acre feet; 67,953,600 lbs water
5. INTLET: none
6. OUTLET: none FLOW (cfs) NA
7. PUBLIC ACCESS: Entire Lake
8. LAND OWNERSHIP: PUBLIC 100%; PRIVATE 0%
9. ESTABLISHED RESORTS: None

1. WATER: **Sedge Lake**
2. LOCATION: Sec 36 T18N R26E Grant Co.
3. SURFACE ACRES: 9 MAX. DEPTH: 15
4. VOLUME: 85 acre feet; 231,042,240 lbs water
5. INTLET: none; connected to Tern Lake
6. OUTLET: none FLOW (cfs) NA
7. PUBLIC ACCESS: Entire Lake
8. LAND OWNERSHIP: PUBLIC 100%; PRIVATE 0%
9. ESTABLISHED RESORTS: None

1. WATER: **Tern Lake**
2. LOCATION: Sec 36 T18N R26E Grant Co.
3. SURFACE ACRES: 8 MAX. DEPTH: 15
4. VOLUME: 70 acre feet; 190,270,080 lbs water
5. INTLET: none; connected to Sedge Lake
6. OUTLET: none FLOW (cfs) NA
7. PUBLIC ACCESS: Entire Lake
8. LAND OWNERSHIP: PUBLIC 100%; PRIVATE 0%
9. ESTABLISHED RESORTS: None

1. WATER: **Desert Wildlife Ponds (16 ponds).**
2. LOCATION: Sec 31 T18N, R27E, Grant Co.
3. SURFACE ACRES: 21 MAXIMUM DEPTH: 6 feet
4. VOLUME: 115 acre feet; 312,586,560 lbs water
5. OUTLET: None. Natural and man-made dikes separate waters (16 separate ponds) in the proposed treatment area (TA) from the Lakes and Winchester Wasteway.
6. STREAM: None FLOW: N/A
7. PUBLIC ACCESS: Entire Area.
8. LAND OWNERSHIP: PUBLIC 100% PRIVATE 0 %
9. ESTABLISHED RESORTS: None

C. Proposed Management Actions

1. WATER: **Aztec Lake**
2. TARGET SPECIES: pumpkinseed sunfish, bluegill, largemouth bass
3. DATE LAST REHABED: never rehabed
4. PROPOSED TREATMENT DATE: September – October 2008
5. REPLANTING DATE: Spring 2009
6. SPECIES: rainbow trout
7. CATCHABLES: 0 FRY: 300
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 2 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 67 lbs., 10 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/ATV/helicopter spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth Personnel ~ 6

1. WATER: **Desert Lake**
2. TARGET SPECIES: pumpkinseed sunfish, bluegill, largemouth bass
3. DATE LAST REHABED: March, 1984
4. PROPOSED TREATMENT DATE: September – October 2008
5. REPLANTING DATE: Spring 2009
6. SPECIES: rainbow trout
7. CATCHABLES: 0 FRY: 8,000
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 1.5 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 525 lbs., 30 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/ATV/helicopter spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth Personnel ~ 6

Note: Desert Lake may be excluded from treatment if further surveys confirm a well-balanced population of warmwater fish.

1. WATER: **North Desert Lake**
2. TARGET SPECIES: pumpkinseed sunfish, bluegill, largemouth bass
3. DATE LAST REHABED: never rehabed
4. PROPOSED TREATMENT DATE: September – October 2008
5. REPLANTING DATE: Spring 2009
6. SPECIES: rainbow trout
7. CATCHABLES: 0 FRY: 300
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 2 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 67 lbs., 10 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/ATV/helicopter spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth Personnel ~ 6

1. WATER: **Harris Lake**
2. TARGET SPECIES: pumpkinseed sunfish, bluegill, largemouth bass
3. DATE LAST REHABED: never rehabed
4. PROPOSED TREATMENT DATE: September – October 2008
5. REPLANTING DATE: Spring 2009

6. SPECIES: rainbow trout
7. CATCHABLES: 0 FRY: 8,000
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 1.5 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 950 lbs., 30 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/ATV/helicopter spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth Personnel ~ 6

1. WATER: **Dune Lake**

2. TARGET SPECIES: pumpkinseed sunfish, bluegill, largemouth bass
3. DATE LAST REHABED: never rehabed
4. PROPOSED TREATMENT DATE: September – October 2008
5. REPLANTING DATE: Spring 2009
6. SPECIES: rainbow trout
7. CATCHABLES: 0 FRY: 2,000
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 1.5 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 190 lbs., 20 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/ATV/helicopter spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth Personnel ~ 6

1. WATER: **Lizard Lake**

2. TARGET SPECIES: pumpkinseed sunfish, bluegill, largemouth bass
3. DATE LAST REHABED: never rehabed
4. PROPOSED TREATMENT DATE: September – October 2008
5. REPLANTING DATE: Spring 2009
6. SPECIES: rainbow trout
7. CATCHABLES: 0 FRY: 500
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 2 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 67 lbs., 10 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/ATV/helicopter spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth Personnel ~ 6

1. WATER: **Meadowlark Lake**

2. TARGET SPECIES: pumpkinseed sunfish, bluegill, largemouth bass
3. DATE LAST REHABED: never rehabed
4. PROPOSED TREATMENT DATE: September – October 2008
5. REPLANTING DATE: Spring 2009
6. SPECIES: rainbow trout
7. CATCHABLES: 0 FRY: 500
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 2 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 67 lbs., 10 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/ATV/helicopter spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth Personnel ~ 6

1. WATER: **Sedge Lake**
2. TARGET SPECIES: pumpkinseed sunfish, bluegill, largemouth bass
3. DATE LAST REHABED: never rehabed
4. PROPOSED TREATMENT DATE: September – October 2008
5. REPLANTING DATE: Spring 2009
6. SPECIES: rainbow trout
7. CATCHABLES: 0 FRY: 2,000
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 1.5 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 230 lbs., 20 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/ATV/helicopter spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth Personnel ~ 6

1. WATER: **Tern Lake**
2. TARGET SPECIES: pumpkinseed sunfish, bluegill, largemouth bass
3. DATE LAST REHABED: never rehabed
4. PROPOSED TREATMENT DATE: September – October 2008
5. REPLANTING DATE: Spring 2009
6. SPECIES: rainbow trout
7. CATCHABLES: 0 FRY: 2,000
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 1.5 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 190 lbs., 20 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/ATV/helicopter spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth Personnel ~ 6

1. WATER: **Desert Wildlife Ponds (16 ponds).**
2. TARGET SPECIES: pumpkinseed sunfish, bluegill, largemouth bass
3. DATE LAST REHABED: never rehabed
4. PROPOSED TREATMENT DATE: September – October 2008
5. REPLANTING DATE: none
6. SPECIES: rainbow trout
7. CATCHABLES: 0 FRY: 0
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 1.5 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 310 lbs., 30 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/ATV/helicopter spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth Personnel ~ 6

II. PURPOSE:

The rehabilitation of these waters will accomplish two purposes -

The larger waters have been most successfully and economically managed as trout fisheries. Remote, walk-in access and either spring or fall fry plants have successfully created extended angling opportunity for this year-around fishery in the past. Periodic rehabilitations are the most expedient manner of controlling the minions of spiny-rayed fishes and have been necessary due to incomplete kills and illegal introductions. The warmwater fishery as it exists has not

maintained the same amount of recreation, as evidenced by the corresponding decline angler participation.

Rehabilitation of all waters, but especially the Desert Wildlife Ponds serves the purposes of wildlife and waterfowl management. Removal of carp, bass, bluegill and pumpkinseed fish will increase invertebrate production and enhance food availability for desired aquatic invertebrates, breeding and molting ducks, and other species of wildlife.

III. INTENDED OUTCOME/MEASURE OF SUCCESS:

WDFW intends to restore the Desert lakes to a popular, quality trout fishery. The average catch rates should be at least five to ten 14-inch yearling trout per angler and a 20 per cent carryover rate. Success of this measure will be apparent through angler contacts at the office, at club functions, and periodic angler surveys at the lakes. Given a reasonable chance of reducing the populations of undesirable species dramatically, the beneficial effects should last approximately 6 to 8 years under current management schemes. Aside from reasons listed under Resource, Recreational and Economic Impacts, to abandon these lakes as trout fisheries is to invite other incursions across the state.

Wildlife surveys have been conducted every year during the month of May since the project began. These surveys are conducted to determine if wildlife species diversity and composition changes occur after the wetland enhancement project began. Annual wildlife surveys will continue to be conducted during May to determine wildlife use in the area. Additional wildlife surveys may be conducted during spring and fall to attempt to evaluate migratory bird use. With the return of the project ponds to an early succession stage, we expect an increase in the species diversity of the area. Waterfowl surveys will be conducted in May (pair counts), July (duck brood count), August (molting ducks), and Oct.-Jan. (monthly aerial surveys for migrant/wintering waterfowl).

IV. RESOURCE IMPACTS:

1. Target species: Pumpkinseed sunfish; Bluegill; Largemouth Bass
2. Regional Habitat, Wildlife and Non-Game biologists have been appraised of our rehabilitation plans. The only concern of consequence is for the northern leopard frog (*Rana pipiens*), which is found extensively north and west of Potholes Reservoir, including the Frenchman and Winchester wasteways and all of the Desert lakes. The northern leopard frog is listed as a State Endangered Species in Washington State, and on the federal species of concern list.
3. Lake rehabilitations in the Desert Lakes may have some potential detrimental effect on the population of northern leopard frogs in the treated water. While relatively tolerant of even heavy doses of rotenone, amphibians (especially larval) are at risk, and herptiles are affected somewhat less so (Bradbury, 1986). Live adult northern leopard frogs have been observed among freshly killed carp at the Homestead Lake rehabilitation. Rotenone levels were double those proposed for the desert lakes, yet the adult frogs did not appear affected. The lakes and smaller marshes in

the desert are in very close proximity to one another, and many adults would be able to escape to adjacent waters. After treatment, re-colonization would be rapid. There is no chance of eliminating an entire population. Frogs that re-enter the previously treated lakes would have fewer competitors for aquatic organisms since the overly abundant populations of spiny-ray fishes would be eliminated or severely diminished. Trout are stocked at much lower rates and competition would be reduced. Thus the overall effect of rehabilitation on the population of northern leopard frogs as a whole would be beneficial.

Timing the treatment for the fall will lessen impacts to the larval stages of the northern leopard frog. Northern leopard frogs commence reproductive activities in the Spring when water temperatures reach around 50 F. While egg development may also occur at around 50 F, the average is probably higher (Nussbaum, Brodie, and Storm. *Amphibians and Reptiles of the Pacific Northwest*). Spring rehabilitations are usually done when water temperatures remain in the 40's F to precede the spawning of the target fishes; however, high water flows preclude treatments at these sites. Rotenone is ineffective in killing animals in the egg stage. Timing of treatments for the autumn will allow most leopard frog larva to metamorphose into adult frogs, which will be unaffected by rotenone at piscicidal levels. We believe that the treatment of these waters would not cause significant negative impacts to the northern leopard frog.

According to Bradbury (1986), the effects of rotenone on benthos are variable, depending on the concentrations and species. Crustaceans are most tolerant while the smaller insects are most affected. Immediate reduction of populations averages 25%, and survival doubles when access to bottom sediments exists. Benthic communities generally recover to at least pretreatment levels within two months. Zooplankton is more severely impacted, and communities generally take two to twelve months to fully recover.

These waters are not a source of potable water for humans or livestock. The area will be closed to fishing, and other recreational uses such as wildlife viewing will be curtailed during the planned period of treatment. The fishery will again be available by fall 2009. Participation in the trout fisheries will exceed that currently found for existing fisheries. An expected increase in angler traffic may disrupt waterfowl use. However, management plans for these waters intend to keep activity low key and consistent by maintaining the year around season and walk-in only access, keeping disturbance to a minimum. Creating a successful wetland enhancement and quality waterfowl hunting area risks increased human use of the area and the associated impacts to habitat and wildlife. There is a potential for conflicts to arise between waterfowl hunters and anglers.

4. Professional biologists and other naturalists have visited this site frequently over the past 40 years. The WDFW Habitat and Wildlife Programs and PHS maps have been consulted. To our knowledge, no endemic, rare, threatened or otherwise listed species will suffer significant negative impacts from the rehabilitation (see above discussion of the northern leopard frog).

V. MITIGATING FOR ADVERSE IMPACTS:

1. Trout fry survival and growth will be greatly enhanced, and future trout fisheries will attain their previous status. This outcome more than mitigates the small loss of angling currently planned for elimination or other human recreation during the planned time of rehabilitation.

Waterfowl breeding, brood rearing, molting, and wintering habitat for all the proposed waters will be greatly enhanced. Human disturbance resulting from the fisheries on adjacent lakes will be managed by limiting access to off-site parking areas to preserve the walk-in fishery. Rehabilitation will be completed before the nesting season begins. The Desert Wildlife Area is made up of diverse habitats and is home to much and varied wildlife, all of which would benefit from the increased production after pumpkinseed removal. No removal of dead fish is planned as the nutrient base contained therein is best returned to the lake.

It is in the interest of all species being managed to refrain from over-taxing the foodbase.

2. No downstream resources exist.
3. Besides the northern leopard frog, other species of concern known to inhabit this area include the Black Tern, Bald Eagle, Sagebrush Lizard, Sage Thrasher, American White Pelican, and White-tailed Jackrabbit. The proposed treatment is not expected to have significant negative impacts to these species.
4. Protective wear for the eyes, face and hands will be available for all applicators of rotenone.
5. The lakes will be posted according to Department of Ecology guidelines to notify the public of the treatment and discourage the public from possessing or consuming dead fish.

VI. RECREATIONAL IMPACT: also see I.A., II and III

Recreational opportunity will be increased. Based on past use and accounting for increased demand, about 200 additional angler trips/week during the months of April through September will occur on these waters. Approximately 5,000 recreation-days will be produced. Angler success should reach three fish per angler. Yearling trout should average about 14 inches. Carryovers should be expected to be about 20% of the catch, and average 15 inches for 2-year-olds and 18 inches for 3-year-olds.

The number of waterfowl hunting trips would be expected to increase, but an estimate of the magnitude of the increase would be difficult to predict. Rehabilitation of the ponds associated with TD -02 would increase the available waterfowl wintering habitat, waterfowl hunting opportunities, wildlife viewing, and economic activity associated with these types of recreation.

Based on past use and accounting for increased demand, at least 200 recreation-days will be produced. The increased number of ducks produced in the waters to be treated will be available to hunters during the waterfowl hunting seasons.

VII. ECONOMIC IMPACTS:

An estimated 5,000 additional trips made to these lakes as a result of the proposed management action would result in an increased economic impact totaling \$189,500 per year to the state's economy (1991 dollars; based DFW estimate of \$37.90 per trip). Rehabilitation would restore the fishery and associated economic activity.

The total annual cost to Columbia Basin Hatchery to plant these lakes with 25,600 fry is \$1,075. The rehabilitation will cost the Department about \$17,000 (including costs of rotenone, time, travel). Even if rehabilitations occur every five years, the cost of fry plants (5 yrs.) and the rehab totals about \$22,000. During this same five years, the fishery would generate about \$948,000 to the state's economy.

The cost to manage with annual catchable plants is generously (in terms of trout survival) estimated at \$23,000 for five years. Interactions between spiny-rayed species and trout are much less predictable, and a comparable program may not result. Further, hatchery space and water are fully utilized in accomplishing the current program. If greater numbers of catchable fish were to be raised, many other waters would suffer cutbacks in current planting allotments. The additional Department investment in hatcheries, and management time to manage our fisheries in this manner would be considerable in the long term.

Given the discussion in part VI, expected economic value is also difficult to estimate. However, as recreational opportunity increases, economic benefits also rise. The number of waterfowl hunting trips would be expected to increase, but an estimate of the magnitude of the increase would be difficult to predict.

Estimates for the cost of the enforcement action necessary to curtail the activity of the individuals responsible for illegal fish plants are not available. However, this cost might be looked upon as a statewide expenditure since some preventive benefit would certainly occur as perpetrators find out the Department takes illegal transport and planting of fish very seriously.

VIII. RELATED MANAGEMENT ACTION:

The Desert lakes will be planted with rainbow trout fry @ < 50/lb. the spring following rehabilitation. Creel checks and population surveys will be conducted as time is available. Possible further management actions include proposing some or all of these waters for a regulation change to selective fisheries (no bait, single barbless hook, reduced limits). Demand for these types of fisheries is increasing, and this type of fishery is also more amenable to terrestrial wildlife management.

Waters within the Desert Wildlife Ponds (TD-02) not treated in 2008 may be treated in following years to remove undesirable fish. The results should yield fish-free waters in those ponds treated with rotenone and no further fish management activities would be required. If total fish kill is not achieved, further treatment may be required in future years if fish populations reach undesirable levels. There will be continued operation and maintenance related management. Some of the on-going management activities will include: controlling undesirable vegetation, and maintaining the integrity of dikes due to beaver activity.

Increased penalties and enforcement activities are desirable if WDFW is ever going to dissuade illegal plantings of state managed waters. Educating the public about the costs in Department dollars and time with emphasis on what WDFW might be able to accomplish with those resources would be a very worthwhile activity for our Media Relations people. This may result in stemming recruitment to this ill-advised group and turning local opinion against the offenders.

IX. PUBLIC CONTACT:

Public support may be best judged by the number of participants in the fishery (vis a vis Recreational Impacts). When these treatments were last proposed in 1997 and 1998, a public hearing was held to explain Region Two 1997-98 rehabilitation proposals, assess public opinion, and address local concerns. The announcement was provided to area papers and radio stations at least a week in advance of the meeting. To date, there has been no public opposition expressed to these rehabilitations. Public hearings will be held in July 2008 to explain Region Two 2008-09 rehabilitation proposals, assess public opinion, and address local concerns. The announcement will be provided to area papers and radio stations at least a week in advance of the meeting. With many of the lakes' users living outside Grant County, actual percentages pro and con are difficult to obtain. Public support may be best judged by the number of participants in the fishery (vis-à-vis Recreational Impacts).

Initiated by: Region Two Fisheries and Wildlife Management

LAKE MANAGEMENT PLANS

updated June, 2008 - J.W. Korth

Waters: Beda and Brookies Lakes

Location: Desert Wildlife Area, Sec 15, 22, T18N, R26E; approximately 18 miles south of Ephrata and 12 miles southwest of Moses Lake, Grant County, WA

	Size:	Maximum Depth:	Volume:
Beda	45 acres	25 feet	350.6 acre feet
Brookies	20 acres	15 feet	200.0 acre feet

Water Source: subsurface seepage springs

Outflow: subsurface

Management History: Beda and Brookies lakes consist of a series of five lakes of diminishing size in a north-south line, with Beda being the largest and northernmost water. Extremely rich in nutrients, all have been managed as trout fisheries since their formation from rising groundwater tables in the 1960s. Like most wetlands in the Columbia Basin, they were formed as groundwater tables rose following irrigation development. Beda was first stocked with eastern brook trout in 1963. In 1966, the stocked species was changed to rainbow trout, and this still remains the species of choice. Brookies lakes apparently formed later, and these four, small and connected waters were first stocked in 1976.

Plants of rainbow trout occur annually, and stocking levels have hovered at about 14,000 rainbow for Beda Lake and 3,000 cumulative for the Brookies Lakes. Spokane rainbow were originally used, but were switched later to Eagle Lakes rainbow stock in 1984 to reduce crowding at the Columbia Basin Hatchery. More recently, in 1994, the stock was again switched to Mt Whitney - another, more available and also a later spawning stock of rainbow trout. With regulation changes in 1997, the allotment for Beda Lake has been reduced to about 10,000 rainbow trout.

Year around seasons and statewide regulations, daily limit of five trout, and bait allowed, have been in effect for most of the fishable history of these waters. Access restrictions (vehicle approach is limited to within 0.25-0.50 miles) spread angler use over the entire season, and Beda was considered a favorite among fly fishers early in its history. In response to increasing crowds of anglers at these waters and popular demand for more selective fisheries statewide, regulations were changed in 1997. While still open year around, selective fishery regulations now apply: single, barbless hooks and no bait, and the limit is one fish.

When competing species are controlled, Beda and Brookies lakes are capable of producing excellent catches throughout the season. In the early years, these waters yielded 5-6 trout per angler trip and frequent incidence of fish over two pounds. As their popularity grew, catches

settled down to about three fish per angler in the 1970s. Yearlings were about 11 inches and 14-20 inch fish were still relatively common.

Sunfish were discovered in these waters in the mid-1970s, and catch rates dropped to about one fish per trip. Largemouth bass were illegally introduced into Beda Lake in the late 1980s, and the lake gained some local notoriety as a fair bass fishery during the early 1990s while the rainbow catch dropped to about 0.3 fish/angler. The lakes were restored to trout fisheries in 1995 through rehabilitation, and catch rates, as well as angler participation, increased dramatically.

Unfortunately, the sunfish persisted, and the fishery began to decline again in 1998. The last rehabilitation was in 2000. White sturgeon happened to be available at the time, and about a dozen 14" fish were stocked in an effort to control remaining sunfish. Several hundred fingerling sturgeon were stocked a few years later. However, by 2005 sunfish again had the upper hand. Brown and tiger trout have also been stocked with the same end in mind, and the same results.

Beda Lake has been supplemented with larger rainbow made available through the Trophy Trout Program. These pound-and-a-half triploids are purchased from private hatcheries (currently Trout Lodge) at about \$3-4/fish. When 3-5,000 are stocked in Beda, a fair to good fishery ensues for the spring. For unknown reasons, few to none remain by fall or carryover to the following spring.

Despite four rehabilitations for Brookies Lakes and four rehabilitations for Beda Lake, pumpkinseed sunfish have persisted. The usual cause for eventual poor trout survival has been a corresponding increase in pumpkinseed sunfish, which compete for the food base. The lakes are fed by subsurface seeps. These seeps, along with the dense fringe of emergent vegetation, probably provide freshwater havens for the targeted species during treatment. No surface connection exists between these waters and the wasteway to allow fish passage. Illegal introductions are undoubtedly the origin of unwanted species in these waters, probably introduced as prey for bass.

Rehabilitation and total fish eradication are difficult enterprises for these lakes; however, angler participation in the trout fisheries make these projects worthwhile relative to the amount of effort and cost involved in treatment even if required every five years.

T&E Flora and Fauna: Professionals from many resource fields have visited this site countless times during the last 40 years. No known report exists of any threatened or endangered species habitually found in or near these lakes. Occasional visits from both bald and golden eagles occur, although no nests of these two species are known in the area. Protected species of waterfowl and other birds frequently are found here at times, as well.

Current Management Objectives:

Continue to manage these lakes for trout fisheries. Year around season, selective fishery. One fish limit, no size restrictions. Provide at least four yearling and one carryover rainbow trout per angler trip for at least 1,000 anglers per season.

1. Fishery Objectives:

<u>Species</u>	<u>Type</u>	<u>Category</u>	<u>Number of Fish</u>		<u>Avg. Size</u>	<u>Exploit.</u>
			<u>/hour</u>	<u>/Angler</u>		<u>Rate</u>
Rainbow	Prod	Selective Fishery	2-3	4+	13 inches	80% 1-yr-olds
				1+	16+ inches	20% 2+-yr-olds

2. Angler use objective (# angler days): Season - 1,000 +

3. Stocking Objectives:

<u>Lake</u>	<u>Species</u>	<u>Number of Fish Stocked</u>			<u>Planting Month</u>
		<u>Total</u>	<u>/Acre</u>	<u>/pound</u>	
Beda	Rainbow	10,000	200	<20	October
Brookies	Rainbow	3,000	150	<20	October

E. Management Strategy:

- Plant rainbow fingerlings in fall.
- Check yearling growth; should be about 13 inches, adjust stocking rate as necessary.
- Expect 80% loss of yearling fish by end of year due to harvest and hooking mortality and natural attrition.
- Maintain about 15-20 percent of the catch at age 2+ years old, 16-20+ inch fish.
- Spot check angling activity randomly as time allows.
- Monitor all fish species periodically by electrofishing or netting.
- Control spiny-ray species with rotenone when trout survival is inadequate to produce a fishery that performs to management objectives.
- Consider the use of sterile, triploid rainbow trout and brown trout

PRE-REHABILITATION PLAN

Beda and Brookies Lakes

I. PROPOSAL

A. Justification for Proposed Rehabilitation

Beda and Brookies lakes, along the Winchester Wasteway, are currently, and have been historically, managed as trout fisheries. These waters have produced popular trout fisheries since their formation in the mid-1960s. Like most wetlands in the Columbia Basin, they formed after groundwater tables rose following irrigation development. During the first years of stocking, anglers averaged 5-6 fish per trip. Catch rates settled down to about 3 fish/man during the early 1970s. Currently, seasons extend year around, and the lakes are managed under selective fisheries regulations.

Definitive numbers were not available for a comparison of recreation at Beda and Brookies lakes. Seasons have always extended year around, so no opening day creel surveys have been done on a regular basis, and angler checks have been sporadic over the years. Both lakes are walk-in fisheries, which attract anglers looking for a 'quality' experience when fishing is good. When predatory and competing species are suppressed, these waters are productive enough to be popular with fly fishers.

Sunfish were discovered in these waters in the mid-1970s, and catch rates dropped to about one fish per trip. Largemouth bass were illegally introduced into Beda Lake in the late 1980s, and the lake gained some local notoriety as a fair bass fishery during the early 1990s while the rainbow catch dropped to about 0.3 fish/man. The lakes were restored to trout fisheries in 1996 through rehabilitation, and catch rates as well as angler participation increased dramatically. However, the rehabilitation was done in spring, and high water levels prevented a thorough treatment. Bass were eradicated, but sunfish persisted, and the fishery began to decline again in 1998. Another rehabilitation was completed for Beda in the fall of 2000 when water levels were lowest. Brookies was not treated as no live fish were found during netting surveys. This treatment was more effective, and the fishery lasted at least five years before sunfish again began to have an impact on fingerling survival. The fishery has been managed through stocking larger fish purchased from private hatcheries (Trout Lodge) the last few years.

Despite five rehabilitations for Brookies Lakes and four rehabilitations for Beda Lake, pumpkinseed sunfish have persisted. The cause for poor trout survival has been a corresponding increase in pumpkinseed sunfish, which compete for the food base. These fish have become so numerous that large schools of sunfish were readily observed in the shallows during the summer. Anglers frequently reported catching the larger sunfish while angling in the shallows for trout. Eventually, the numbers of sunfish competing for the same resources out-stripped lake productivity, and growth of all fish declines.

The lakes are fed by subsurface seeps. These seeps, along with the dense fringe of emergent vegetation, probably provide freshwater havens for the targeted species during treatment. There is no surface connection exists between these waters and the wasteway to allow fish passage. Illegal introductions are undoubtedly the origin of unwanted species in these waters.

Proximity to the wasteway, the resultant springs, and the dense aquatic and emergent vegetation has made this a difficult rehabilitation in the past. Treatment will be attempted in September or very early October, if possible, when the wasteway is at its lowest flow and presumably subterranean flows to Beda Lake would also be diminished. Water levels in these lakes will also be lowest during this period, and there will be less inundation of the fringe emergent vegetation. Aquatic vegetation will, unfortunately, be at peak growth and will require greater amounts of liquid rotenone for effective treatment.

Alternatives to rehabilitation are costly or impractical. Stocking catchable sized fish cost almost ten times the cost of a fry plant, and Region Two lacks the hatchery space and water to institute a catchable fish stocking program. Optimistic estimates of survival of 4-6 inch advanced fry in larger mixed species waters range from 10-20 percent. Spring fry survival in lakes free of competing species ranges from 50-80 percent. It has been 8 years since the last treatment of these lakes. WDFW policy states that lake rehabilitation is an option for eliminating illegally planted fish to restore the intended management scheme.

B. Physical Description of Water Proposed for Rehabilitation

1. WATER: Beda Lake

2. LOCATION: Sec 15,22 T18N R26E Grant Co.
3. SURFACE ACRES: 45 MAX. DEPTH: 25
4. VOLUME: 350.6 acre-feet; 952,981,286 lbs H₂O
5. INLET STREAM: subterranean flow.
6. OUTLET STREAM: none
7. PUBLIC ACCESS: Entire Lake, walk in only, no facilities.
8. LAND OWNERSHIP: Public 100%
9. ESTABLISHED RESORTS: None

1. WATER: Brookies Lake

2. LOCATION: Sec 22 T18N R26E Grant Co.
3. SURFACE ACRES: 20 MAX. DEPTH: 15
4. VOLUME: 200 acre-feet; 543,628,800 lbs H₂O
5. INLET STREAM: subterranean flow.
6. OUTLET STREAM: none
7. PUBLIC ACCESS: Entire Lake, walk in only, no facilities.
8. LAND OWNERSHIP: Public 100%
9. ESTABLISHED RESORTS: None

C. Proposed Management Actions

1. WATER: **Beda Lake**
2. TARGET SPECIES: pumpkinseed sunfish
3. DATE LAST REHABED: April 10-11, 2000
4. PROPOSED TREATMENT DATE: September - October 2008
5. REPLANTING DATE: spring 2009
6. SPECIES: rainbow trout
7. CATCHABLES: 2-3,000 if available FINGERLINGS: 5,000
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 2 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 1,890 lbs., 90 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/ATV spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth Personnel ~ 6

1. WATER: **Brookies Lake**
2. TARGET SPECIES: pumpkinseed sunfish
3. DATE LAST REHABED: April 3 and 5, 1996
4. PROPOSED TREATMENT DATE: September - October 2008
5. REPLANTING DATE: spring 2009
6. SPECIES: rainbow trout
7. CATCHABLES: 1,000 if available FINGERLINGS: 2,000
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 2 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 1,078 lbs., 60 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/ATV spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth Personnel ~ 4

II. PURPOSE:

The Washington Department of Fish and Wildlife (DFW) provides many types of fisheries in response to public desires. DFW manages both trout and warmwater recreational fisheries based on many different species of fish and levels of difficulty. Public demand for and participation in trout fisheries is very high. These fisheries are prized by anglers willing to sacrifice harvest for the chance to catch and release larger fish. Beda Lake is a favorite among the fly fishing crowd.

Beda and Brookies lakes have been most successfully and economically managed as lowland lake trout waters since their formation in the early 1960s, and since 1996 as selective fisheries managed for above average catch rates, large yearling trout, and higher than average carryover rates. Management intends to return these lakes to trout fisheries, as per the Management Plans established almost two decades ago. Rehabilitation will eliminate or drastically reduce interspecific competition and allow the trout fisheries to flourish.

Complete rehabilitation is the only feasible method of restoring these waters to this type of management scheme. The cost of stocking trout large enough to mimic the situation developed under current management would be 30 times as great just for the feed needed at the hatchery, and the quality of the resultant fish would not compare favorably in anglers' minds with fish

grown in the lakes.

III. INTENDED OUTCOME/MEASURE OF SUCCESS:

DFW intends to restore Beda and Brookies lakes to a popular, quality trout fishery. The average catch rates should be at least five to ten 14-inch yearling trout per angler and a 20 per cent carryover rate. Success of this measure will be apparent through angler contacts at the office, at club functions, and periodic angler checks at the lakes. Given a reasonable chance of reducing the populations of undesirable species dramatically, the beneficial effects should last approximately 6 to 8 years under current management schemes. Aside from reasons listed under Resource, Recreational and Economic Impacts, to abandon these lakes as trout fisheries is to invite other incursions across the state.

IV. RESOURCE IMPACTS:

1. Target species: Pumpkinseed sunfish
2. District and Regional Habitat, Wildlife and Non-Game biologists have been apprised of current rehabilitation plans. No substantial objections were raised, and only cautionary concerns were expressed on the potential impacts to non-targeted species.
3. According to Bradbury (1986), the effects of rotenone on benthos are variable, depending on the concentrations and species. Crustaceans are most tolerant while the smaller insects are most affected. Immediate reduction of populations averages 25%, and survival doubles when access to bottom sediments exists. Benthic communities generally recover to at least pretreatment levels within two months. Zooplankton is more severely impacted, and communities generally take two to twelve months to fully recover. While relatively tolerant of even heavy doses of rotenone, amphibians (especially larval) are at risk, and herptiles are affected somewhat less so. Almost no chance of eliminating an entire population exists.
4. Loss of the year 2009 fishery may ensue if catchable sized trout are unavailable for stocking for the season. The fingerling-based fishery will again be available by the spring of 2010. Hunting will be curtailed during the treatment (about 2-4 days). The lakes will be closed to angling, and other recreational uses such as boating, and swimming will be curtailed during the planned period of treatment. These waters are not a source of potable water for humans.
5. Professional biologists and other naturalists have visited this site frequently over the past 40 years. To our knowledge, no endemic, rare, threatened or otherwise listed species have been documented nor will any be impacted by the rehabilitation.

V. MITIGATING FOR ADVERSE IMPACTS:

1. Provided catchable-sized fish are available the following spring, no loss of recreational fishing time will occur for Beda Lake. Trout fry survival and growth will be greatly enhanced, and future trout fisheries will attain their previous status. No removal of dead fish is planned as the nutrient base contained therein is best returned to the lake.

Fall rehabilitation will not interfere with waterfowl spring nesting. The eradication of spiny-ray fishes would also benefit waterfowl through increased production of invertebrates. Stocked populations of trout will not be anywhere near as numerous as the current spiny-ray population. It is in the interest of all species being managed to refrain from over-taxing the food-base.

2. No downstream resources exist.

3. No endemic, rare, threatened or otherwise listed species are known from this area.

4. Protective wear for the eyes, face and hands will be available for all purveyors of rotenone.

5. The lakes will be posted according to Department of Ecology guidelines to notify the public of the treatment and discourage the public from possessing or consuming dead fish.

VI. RECREATIONAL IMPACT: also see I.A., II and III

Recreational angling opportunity will be increased if the spiny-rayed fishes are removed from Beda and Brookies lakes and fingerling trout stocking programs are reinstated. Given the success of the planned management action, 1,000 angler trips are conservatively estimated for the season. Anglers' catch should average about five to ten fish per trip. Yearling trout should average about 13-14 inches. Carryovers should be expected to be about 15-20 percent of the catch, and average 16-17 inches for 2-year-old fish.

VII. ECONOMIC IMPACTS:

An estimated 1,000 trips made to these lakes as a result of the proposed management action would result in an increased economic impact totaling \$37,900 per year (1991 dollars; based WDW estimate of \$37.90 per trip). Currently, it costs over \$12,000 per year to stock the larger fish necessary to attract anglers to this venue. After rehabilitation, the total annual costs to Columbia Basin Hatchery to plant these lakes with 4,000 catchable rainbow the first year is \$2,600 and 7,000 fingerlings each year thereafter is \$600 per annum. The rehabilitation will cost the Department about \$18,000 (including costs of rotenone, time, travel). Even if rehabilitations occur every five years, the cost of fingerling plants (5 yrs.), catchables for the season after rehabilitation, and the rehab totals \$23,600. During this same five years, the fishery would

generate almost \$200,000 to the state's economy.

The cost to manage these waters for the same five year period with annual plants of larger fish (about 4,000 fish per year) is generously (in terms of trout survival) estimated at \$60,000. However, interactions between spiny-rayed species and trout are much less predictable, and a comparable program would not result. In addition, stocking catchable-sized trout does not produce as desirable a fishery in the angler's eye as fingerling stocking programs; this is particularly true of the clientele at Beda and Brookies lakes.

Further, hatchery space and water are fully utilized in accomplishing the current program. If greater numbers of catchable fish were to be raised, many other waters would suffer cutbacks in current planting allotments. The additional Department investment in hatcheries, and management time to manage our fisheries in this manner would be considerable in the long term.

Estimates for the cost of the enforcement action necessary to curtail the activity of the individuals responsible for illegal fish plants are not available. However, this cost might be looked upon as a statewide expenditure since some preventive benefit would certainly occur as perpetrators find out the Department takes illegal transport and planting of fish very seriously.

VIII. RELATED MANAGEMENT ACTION:

Beda and Brookies lakes will be stocked with 7,000 rainbow trout fingerlings @ < 100/lb. Provided the fish are available, 4,000 catchable-sized rainbow trout will be stocked for the 2009 season. Creel checks and population surveys will be conducted as time is available.

Increased penalties and enforcement activities are desirable if WDFW is ever going to dissuade illegal stocking of state managed waters. Educating the public about the costs in Department dollars and time with emphasis on what WDFW might be able to accomplish with those resources would be a very worthwhile activity for WDFW Public Affairs office. This may result in stemming recruitment to this ill-advised group and turning local opinion against the offenders.

IX. PUBLIC CONTACT:

A public hearing will be held in July 2008 to explain Region Two 2008-09 rehabilitation proposals, assess public opinion, and address local concerns. The announcement will be provided to area papers and radio stations at least a week in advance of the meeting. With many of the lakes' users living outside Grant County, actual percentages pro and con are difficult to obtain. Public support may be best judged by the number of participants in the fishery (vis-à-vis Recreational Impacts).

Initiated by: Region Two Fisheries Management

LAKE MANAGEMENT PLANS

Updated July, 2008 - J.W. Korth and J. Wisniewski

Water(s): North Potholes (Westlake ponds)

Description: Potholes Wildlife Management Area, Section 31, T19N, R28E; Section 36, T19N, R27E and Section 1, T18N, R27E. Approximately 2 miles west of Moses Lake, Grant County, WA

teresa

Size:	Maximum Depth:	Volume:
125 surface acres	8 feet	300 acre feet

OUTLET: None. Natural and man-made dikes separate waters (40 separate ponds) in the proposed treatment area (TA) from the main body of Potholes Reservoir.

INLET: none **Water Source:** Potholes Reservoir and subsurface seepage from Moses Lake and irrigated land.

Management History: The water proposed for treatment is a peripheral part of Potholes Reservoir and is within the Potholes Wildlife Area. Surface water in the treatment area is isolated from the remainder of Potholes Reservoir by a series of small dikes that were constructed in the late 1970's. The purpose of the dike system was to allow management of warm-water (spiny-ray) fish species to provide an enhanced fishery. Management consisted primarily of removing carp and other undesirable fish species and re-stocking with desirable species (largemouth bass and bluegill).

In addition to the use by waterfowl, the TA is used heavily by a wide variety of wetland-associated wildlife species including the state endangered Northern Leopard Frog (NLF). The TA and a small part of Potholes Reservoir immediately adjacent to it contains the entire known population of the species in Washington.

Another of the more significant wildlife uses of the TA is by breeding ducks. Breeding duck use increased dramatically after rotenone treatment to remove carp in 1980. Numbers of duck broods peaked at very high levels (100+) in the early 1980's, but declined annually to pre-treatment (very low) numbers by summer of 2003. Carp were observed in waters of the TA by the late-1980's.

The focus of wildlife management in the TA has been to insure habitat quality for leopard frogs and populations of a diverse assemblage of wetland-obligate wildlife species including breeding waterfowl and promote wildlife observation that does not result in negative impact to wildlife use.

Some of the more significant planned wildlife-related management actions in the TA in the future include: 1) Enhancing habitat quality for the NLF and desirable wetland-obligate wildlife species. 2) Minimizing human disturbance during the nesting and brood-rearing period for

ducks. 3) Maximizing in-water food resources (i.e., invertebrates and submerged aquatic plants) for ducks (e.g., carp removal). 4) Promotion of wildlife viewing in a manner that minimizes human disturbance of wildlife (i.e., design and implement a watchable wildlife 'trail' and other facilities to support it in the area). 5) Implement management actions (e.g., bullfrog control, tall emergent control and diking to isolate individual ponds) to benefit the state-listed Northern Leopard Frog.

T&E Flora and Fauna: Professionals from many resource fields have visited this site countless times during the last 40 years. Use of the area by several wildlife species of concern has been documented. These species include:

- | | |
|--------------------------|--------------------------------|
| 1) Northern Leopard Frog | (State endangered) |
| 2) Bald Eagle | (State and Federal threatened) |
| 3) Western Grebe | (State candidate) |
| 4) Sagebrush Lizard | (State candidate) |

The TA and a small part of Potholes Reservoir immediately adjacent to it is the only location known to support the NLF in Washington. Research to identify limiting factors and habitat relationships for the purpose of protecting and enhancing the population is in progress and been conducted in the TA since 2002. Bald Eagle use of the TA is primarily during winter and early spring for feeding. Waterfowl is the primary component of the eagle's diet in the TA.

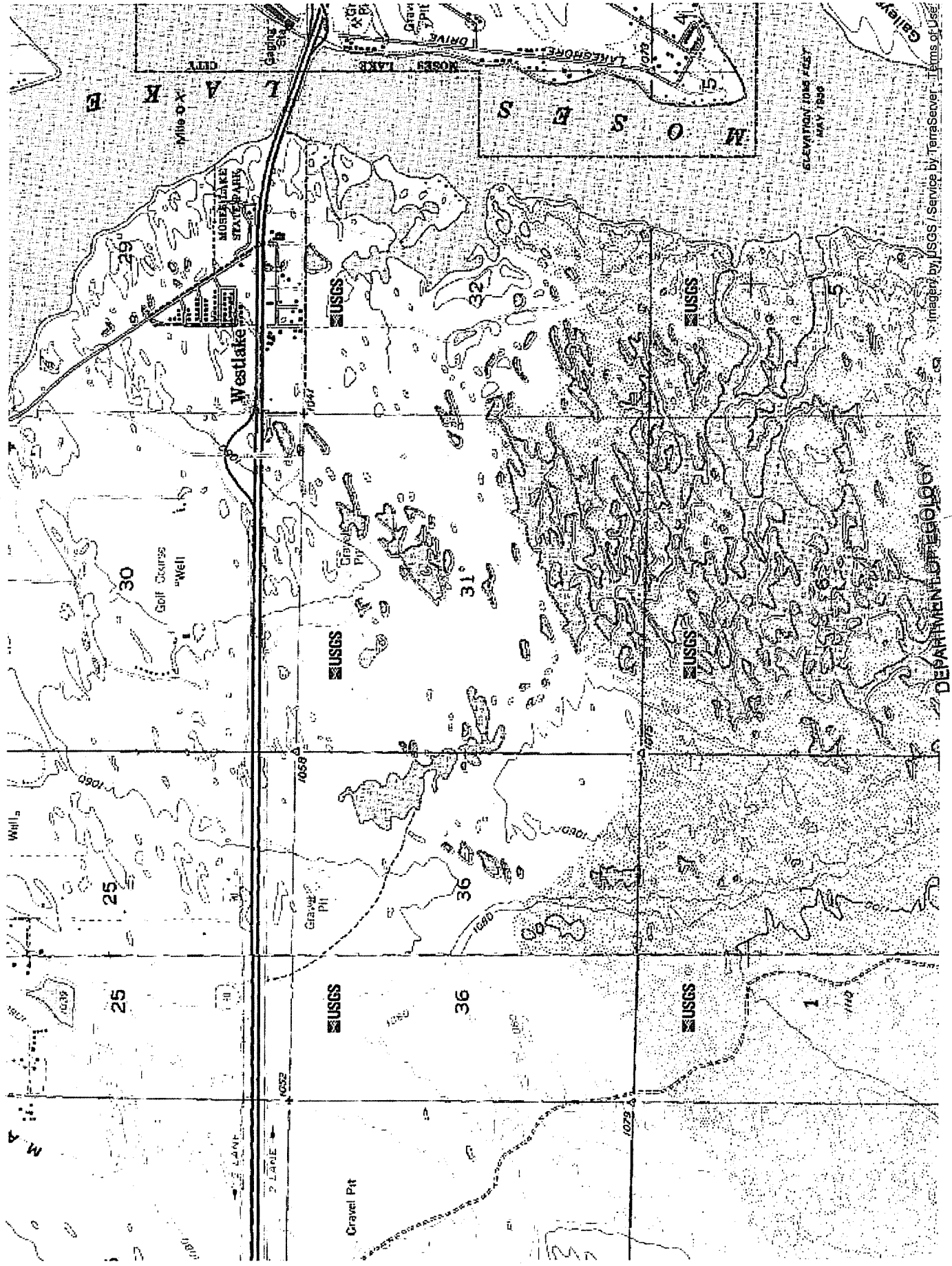
Current Fishery Management Objectives and Strategy: Plan for at least half of the ponds to remain fish-free to benefit Northern Leopard Frogs and ducks, primarily. Some of the larger ponds that do not dry up could have fish and fisheries without too severe a negative impact on wildlife use, especially if fishing intensity is "low".

- Manage for largemouth bass, crappie and bluegill.
- Season: February 1 – mid October (last day before hunting season opener)
- Statewide limits/size restrictions for all species.
- Provide low key, walk-in fishery (maybe 500 angler trips per year)
- Survey periodically (electrofishing, netting).
- Spot check angler use randomly during the year and assess periodically for presence of undesirable species.
- Continue rehabilitation with rotenone when populations of unwanted fish species become over-abundant.
- Re-stock as necessary with desired species salvaged from other area lakes.

Current Wildlife Management Objectives and Strategy:

Current wildlife-related management actions in the TA include: 1) NLF research and management. 2) Minimizing human disturbance during the nesting period for ducks and geese. 3) Maximizing in-water food resources (i.e., invertebrates and submerged aquatic plants) for ducks, geese and leopard frogs (e.g., coordinating with Fish Management program for carp removal). 4) Promoting wildlife viewing in a manner that minimizes human disturbance of wildlife. 5) Implementing management actions to benefit desirable species of wildlife and control/limit undesirable species.

NORTH POTHOLES (WESTLAKE PONDS)



UNITED STATES DEPARTMENT OF JUSTICE
FEDERAL BUREAU OF INVESTIGATION
WASHINGTON, D. C. 20535

MEMORANDUM FOR THE DIRECTOR

100-100000

PRE-REHABILITATION PLAN

North Potholes (Westlake ponds)

I. PROPOSAL

A. Justification for Proposed Rehabilitation

Ponds within the proposed treatment area (TA) were treated with rotenone in Sept. 1980 to remove undesirable fish species including carp and provide the opportunity for a managed fish population of warm-water (spiny-ray) species to provide a sport fishery. Breeding duck use increased dramatically post-treatment. Numbers of duck broods peaked at very high levels in the mid-1980's and declined annually to pre-treatment (very low) numbers by summer of 2003. Carp were observed in most ponds in the TA by the late-1980's. The dominance of carp is the likely cause of the dramatic decline in observed duck use.

The TA and a small part of Potholes Reservoir immediately adjacent to it contains the entire known population of the state-endangered Northern Leopard Frog (NLF) in Washington. Since 1980, and the last rotenone treatment, a breeding population of bullfrogs has become established in the TA. Treatment with rotenone would reduce reproduction of bullfrogs, a serious threat to the NLF.

B. Physical Description of Water Proposed for Rehabilitation

1. WATER: Ponds in the northern-most part of Potholes Reservoir.
2. LOCATION: Section 31, T19N, R28E; Section 36, T19N, R27E and Section 1, T18N, R27E. Approximately 2 miles west of Moses Lake, Grant County, WA
3. SURFACE ACRES: 125 MAXIMUM DEPTH: 8 feet
4. VOLUME: lbs H₂O (300 acre-feet)
5. OUTLET: None (A series of small dikes separate waters in the TA from the main body of Potholes Reservoir.
6. STREAM: None FLOW: N/A
7. PUBLIC ACCESS: Entire Area.
8. LAND OWNERSHIP: PUBLIC 100% PRIVATE 0 %
9. ESTABLISHED RESORTS: None

C. Proposed Management Actions

1. WATER: ~40 ponds in the northern-most part of Potholes Reservoir.
2. TARGET SPECIES: carp and bullfrog larvae
3. DATE LAST REHABED: Sept. 1980 and Sept 2006 (small portion of TA)
4. PROPOSED TREATMENT DATE: September - October, 2006
5. REPLANTING DATE: to be determined
6. SPECIES: possible restock with bass and bluegill
7. CATCHABLES: na ; FINGERLINGS: na
8. PROPOSED TOXICANT: Rotenone, liquid CONCENTRATION: 4 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 350 gal.

9. METHOD OF APPLICATION: helicopter and ground spray

10. CREW DESCRIPTION: Leader(s) Rich Finger Personnel ~ 6

II. PURPOSE:

Rehabilitation of the TA serves the purposes of fisheries, waterfowl, and endangered species management. Removal of carp will increase invertebrate production and enhance food availability for desired fish species, ducks, and other species of aquatic wildlife. Removal of bullfrog larvae will reduce competition and predation by bullfrogs on Northern Leopard Frogs and other native vertebrates.

III. INTENDED OUTCOME/MEASURE OF SUCCESS:

Waterfowl surveys will be conducted in July (duck brood count), August (molting ducks), and Oct.-Jan. (monthly aerial surveys for migrant/wintering waterfowl). Surveys for determining the presence of leopard frogs and bullfrogs will be made during spring and summer. Random creel surveys and biological sampling, as well as public comment, will be the measure of success for fisheries, if established. The complete elimination of carp from a system of this type is a challenge and certainly no certainty. Without a complete kill, 5 - 6 years of benefit would still be realized before rehabilitation is again necessary.

IV. RESOURCE IMPACTS:

1. The intent is that populations of the target species, carp and bullfrogs, will be severely and negatively impacted.
2. District and Regional Fisheries, Habitat, and Wildlife biologists support the proposed rehabilitation plan. The rehabilitation will benefit leopard frogs since it will decrease competition and predation on this species, especially from exotic bullfrogs. The rehabilitation would be done in fall, when larval leopard frogs have already metamorphosed, but bullfrog tadpoles would be susceptible

According to Bradbury (1986), the effects of rotenone on benthos are variable, depending on the concentrations and species. Crustaceans are most tolerant while the smaller insects are most affected. Immediate reduction of populations averages 25%, and survival doubles when access to bottom sediments exists. Benthic communities generally recover to at least pretreatment levels within two months. Zooplankton is more severely impacted, and communities generally take two to twelve months to fully recover. While relatively tolerant of even heavy doses of rotenone, amphibians (especially larvae) are at risk, and turtles are affected somewhat less so.

3. The fishery has already been almost completely lost, but could be reestablished again soon after treatment. Creating a successful fishery risks increased human use of the area and the associated impacts to habitat and wildlife. Seasons and access might be structured to minimize disturbance to leopard frogs and waterfowl nesting/rearing. These waters are not a source of potable water for humans or livestock. The area will be closed to angling, and other recreational uses such as wildlife viewing during the planned period of treatment.

4. Professional biologists and other naturalists have visited this site frequently over the past 40 years. The WDFW Habitat and Wildlife Programs and PHS maps have been consulted. The TA is used heavily by several species of wildlife in addition to the endangered NLF and breeding ducks. The proposed treatment would increase use by desirable wildlife species. No wildlife uses will be impacted in a negative way by the proposed rotenone treatment.

V. MITIGATING FOR ADVERSE IMPACTS:

1. Human disturbance resulting from the fishery might be managed by limiting access to off-site parking areas to preserve the walk-in fishery. Rehabilitation will be completed before the nesting season begins. The diverse habitat in the TA is home to much and varied wildlife, all of which would benefit from the increased aquatic food production after carp removal. Leopard frogs will benefit from the reduction of bullfrogs as a result of removing bullfrog larvae. No removal of dead fish is planned as the nutrient base contained therein is best returned to the lake.

2. No "downstream" resources will be impacted. Water within the TA is isolated from other water in the Potholes Reservoir by a series of small dikes.

3. No endemic, rare, threatened or otherwise listed species known to inhabit this area will be adversely affected by the proposed treatment.

4. Protective wear for the eyes, face and hands will be required for all purveyors of rotenone.

5. Ponds will be posted according to Department of Ecology guidelines to notify the public of the treatment and discourage the public from possessing or consuming dead fish.

VI. RECREATIONAL IMPACT: ALSO SEE PROPOSAL I.A.

Almost no fishery currently exists, so angling opportunity could be greatly enhanced. Hard data are not available to accurately judge CPUE on these waters because a shortage of manpower prohibits surveying all the area year around lakes and ponds on a regular basis. Angling pressure in the TA is has been "low key" and consistent in the past, rather

than intense and concentrated temporarily as on opening day waters. Recreational opportunity will be increased.

The increased number of ducks produced in the waters to be treated will be available to hunters.

VII. ECONOMIC IMPACTS:

Given the discussion in part VI, and due the as yet undetermined nature of the fishery, the expected economic value is also difficult to estimate. However, as recreational opportunity increases, so goes the flow of dollars. Even a minimal fishery could be expected to generate several hundred additional angling trips, resulting in an increased economic impact totaling \$7-8,000 per year to the state's economy (1991 dollars; based WDW estimate of \$37.90 per trip). Rehabilitation would bring back the fishery and associated economic activity.

The number of waterfowl hunting trips would be expected to increase, but an estimate of the magnitude of the increase would be difficult to predict.

Placing a value on protecting the state's few remaining populations of leopard frogs is complicated. Certainly there would be some concrete value to wildlife viewers, but the number of such trips generated is not known. Protecting the state from the financial consequences of federal law should leopard frogs become federally listed would be highly valued. It is considered better at this juncture to protect the remains of the population than assume it valueless and do nothing.

VIII. RELATED MANAGEMENT ACTION:

Assessment surveys for leopard frogs, waterfowl production, and other wildlife would follow treatment. If a fishery is deemed desirable and a good fit with frog and waterfowl objectives, broodstock to re-populate these waters would likely be captured from other systems.

IX. PUBLIC CONTACT:

A public hearing will be held on July 15, 2008 in Ephrata, and in Olympia, Spokane, and Colville later in July, to explain this rehabilitation proposal, assess public opinion, and address local concerns. The announcement will be provided to area papers and radio stations about one week in advance of the meeting, and all landowners will be notified by letter. An outline of the rehabilitation program, fish and wildlife management objectives, and individual waters in the proposals will be presented and discussed.

Initiated by: Region Two Fisheries and Wildlife Management

LAKE MANAGEMENT PLAN

Water: Big Buck (Shaw) Lake

Management Type: Trout Only

Location: 4 miles northwest of Twisp, Washington lying within Sec 2 and 35, T33N, R21E

Size: 20 acres, maximum depth 26 feet, 200 acre-feet

Water Source: Sub surface

Outflow: Intermittent, flows in extremely wet years only

Management History: Big Buck (Shaw) Lake is a year round water body that provides some quality spring and fall trout fishing for the local angling population. Eastern brook trout have been planted in the past, but frequency of winterkill provides limited carryovers. In recent years, catchable rainbow planted in early spring have done quite well and produced fish in the 14-15 inch range by October.

Illegal plants of largemouth bass have recently reduced trout growth via competition to the point where catchable trout plants have been suspended.

Current Management Objectives: Management should be geared toward catchable rainbow plants only to provide a good quality trout fishery during the spring and fall. A small number of fingerling rainbow trout could be planted to test over wintering capability.

Fishery Objectives:

<u>Species</u>	<u>Type</u>	<u>Category</u>	<u>Fish/hour</u>	<u>Fish/angler</u>	<u>Ave size</u>
RB	Production	Standard	1.5	2-3	11"-15"

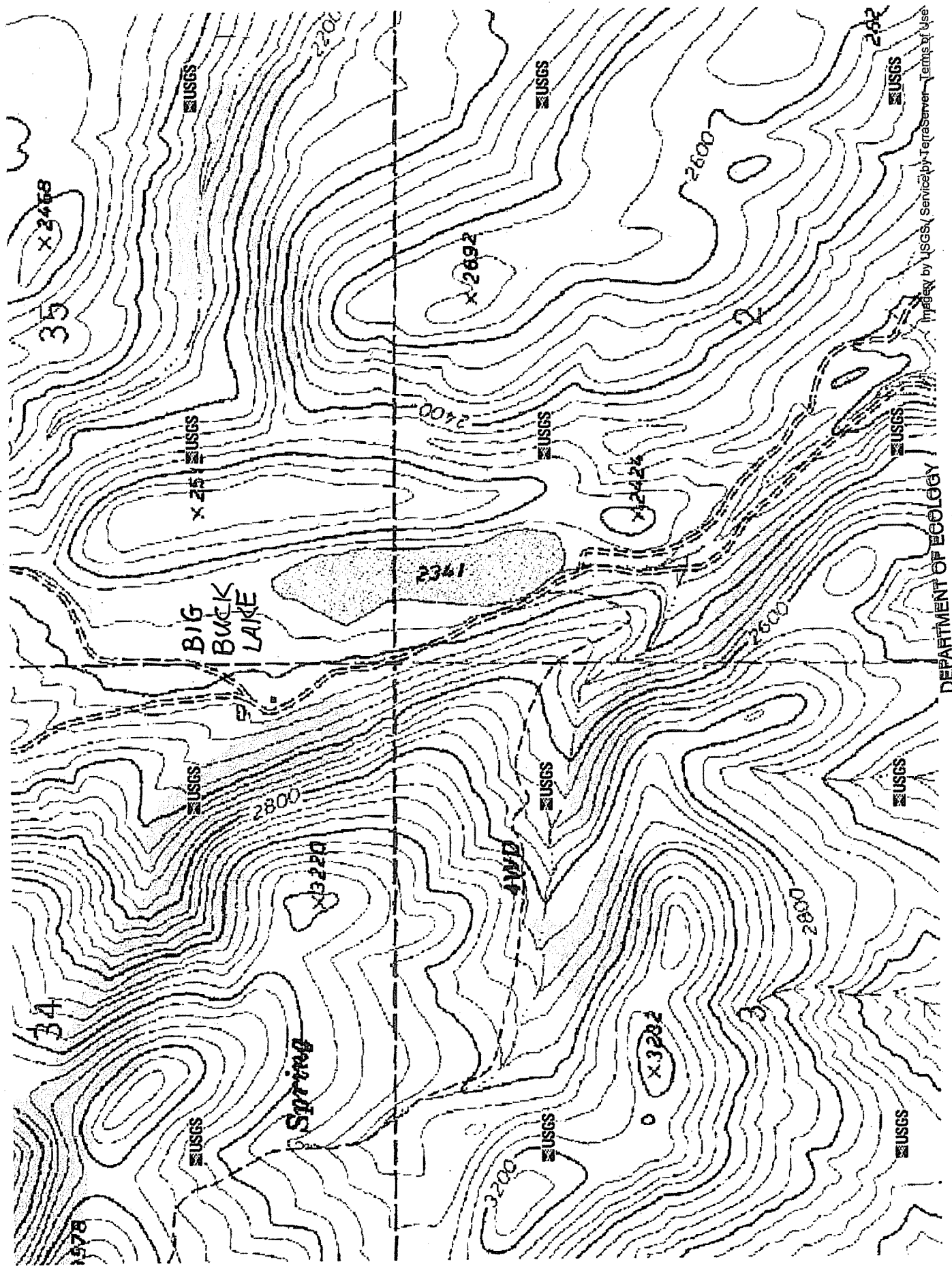
Angler use objective (# angler days): 200

Stocking Objectives:

<u>Lake</u>	<u>Species</u>	<u>Total Fish</u>	<u>Fish/Acre</u>	<u>Fish/pound</u>	<u>Planting Month</u>
Big Buck	RB	1,000	50	2	April
	RB	500	25	75	May

Management Strategy:

- Check lake in early spring for any yearling fish from previous year's plant
- Plant both fingerling and catchable trout to test over wintering capability
- Monitor angling activity and catch rates periodically throughout season
- Closely monitor any invasive species and react immediately to control population by all means before treating with rotenone (angling, electroshocking, netting, and regulation changes).



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[illegible]

Figure 1 is a schematic diagram of the experimental setup. It shows a subject sitting at a table, viewing a video screen. A camera is positioned above the screen. A light source is positioned to the left of the screen. A scale bar is shown below the screen. The diagram is labeled with 'Subject', 'Video Screen', 'Camera', 'Light Source', and 'Scale Bar'.

PRE-REHABILITATION PLAN

Big Buck (Shaw) Lake

I. PROPOSAL

A. Justification for Proposed Rehabilitation

- (1-2) Big Buck (Shaw) Lake is located on the Methow Wildlife Area near Winthrop and is a very popular lake with locals who take advantage of the excellent growth rate for planted trout. In recent years, largemouth bass were illegally introduced and have since overpopulated the lake producing very poor trout fishing. In addition, largemouth bass could during high flow years filter down into the Twisp River and interact with ESA-listed species. Lake treatment is necessary to restore the lake to trout only waters and to remove non-native species from the system.
- (3) Primary management of these waters is for trout only.
- (4) Big Buck (Shaw) was successfully treated in 1977 to remove brown bullheads.

B. Physical Description of Water Proposed for Rehabilitation

- WATER: Big Buck (Shaw) Lake
- LOCATION: Sec 2 and 35, T33N, R21E, Okanogan Co.
- SURFACE ACRES: 20
- MAX. DEPTH: 26
- VOLUME: 200 acre-feet
- OUTLET: Intermittent
- STREAM: MILES N/A FLOW (cfs)
- PUBLIC ACCESS: Department of Fish and Wildlife
- LAND OWNERSHIP: Public 100%
- ESTABLISHED RESORTS: None

C. Proposed Management Actions

- WATER: Big Buck (Shaw) Lake
- TARGET SPECIES: Largemouth Bass
- DATE LAST REHABED: 1977
- PROPOSED TREATMENT DATE: Oct 2008
- REPLANTING DATE: Late-spring 2009
- SPECIES: Rainbow Trout
- STOCKING: 1,000 catchable (10") rainbow trout, 500 fingerlings (3"-4")
- PROPOSED TOXICANT: Rotenone, powder and liquid
- CONCENTRATION: 1 ppm
- AMOUNT (ROTENONE AT 5% ACT. INGRED): 540 lbs, 10 gal liquid
- METHOD OF APPLICATION: pumper boats - slurry and spray; ATV with sprayer; small boat with small sprayer, backpack sprayers
- CREW DESCRIPTION: Leader Robert Jateff, Personnel 4-5

II. PURPOSE:

- Big Buck (Shaw) Lake has been managed as a catchable trout fishery the last 10-15 years. Complete rehabilitation is necessary to restore the trout fishery and to prevent non-native species from filtering into the Twisp River during periods of high flow. Removal of all competing species is the goal of the rehabilitation.

III. INTENDED OUTCOME/MEASURE OF SUCCESS:

- We intend to restore Big Buck (Shaw) Lake to its historic trout fishery, and improve its popularity by maintaining good quality trout throughout the duration of the season. Success of this measure will be apparent during annual creel surveys and population sampling. Given a reasonable chance of eliminating the populations of undesirable species, the beneficial effects should be noticeable one-two years post treatment.

IV. RESOURCE IMPACTS:

- Target species: largemouth bass
- District and Regional Habitat, Wildlife and Non-Game biologists have been appraised of our rehabilitation plans and there were no immediate concerns.
- According to Bradbury (1986), the effects of rotenone on benthos are variable, depending on the concentrations and species. Crustaceans are most tolerant while the smaller insects are most affected. Immediate reduction of the population average 25%, and survival doubles when access to bottom sediments exists. Benthic communities generally recover to at least pretreatment levels within two months. Zooplankton is more severely impacted, and communities generally take two to twelve months to fully recover. While relatively tolerant of even heavy doses of rotenone, amphibians (especially larval) are at risk, and herptiles are affected somewhat less so.
- Participation in the trout fisheries should exceed that currently found for existing fisheries. The water in the lake is used for recreation. Dead fish along the shoreline will not be a public nuisance since the lake will be closed to fishing.

V. MITIGATING FOR ADVERSE IMPACTS:

- Trout survival and growth will be greatly enhanced. No removal of dead fish is planned as the nutrient base contained therein is best returned to the lake. Disturbance of waterfowl during treatment or by the anticipated fishery will be offset by increased food availability as the uncontrollable numbers of spiny-rayed fishes are eliminated in favor of easily balanced populations of trout.
- Water will be confined to the lake proper, and treatment will be conducted in the fall when the lake is at its lowest level.
- Protective gear for the eyes, face, hands and clothes will be supplied on-site for all purveyors of rotenone.
- The lake will be posted according to Department of Ecology guidelines to notify the public of the treatment and discourage the public from possessing or consuming dead fish. The landowners will be notified of the rehabilitation and consequent exposure of livestock to rotenone.

VI. RECREATIONAL IMPACT: also see I.A., II and III

- Recreational angling opportunity will be increased if the undesirable species are removed from Big Buck (Shaw) Lake. The level of participation will dwindle to almost nothing if no action is taken immediately. Given the success of the planned management action, as many as 200 fishing days are estimated for the season. Anglers should average 2-3 fish per day within the 11"-12" range, with carryover fish to 15 inches.

VII. ECONOMIC IMPACTS:

- Rehabilitation would restore the fishery and associated economic activity. An estimated 200 angler trips will be made to Big Buck (Shaw) Lake as a result of the proposed management action, with an economic impact of \$26,400 per year (2004 dollars; based on WDW estimate of \$132 per trip). Catchable plants will cost the agency \$1,400, and can be easily accomplished under current hatchery programs.
- The cost of treatment will be approximately \$2,000, but the increase in license sales and subsequent boost to the local economy will more than offset that loss within two-three years after treatment.

VIII. RELATED MANAGEMENT ACTION:

- Approximately 1,000 rainbow trout will be stocked in the spring at 10 inches in length. In addition, fingerling rainbow plants will be tested to see if over wintering capability does exist within the lake. Creel checks will be done annually on Big Buck (Shaw) Lake, as well as monitoring for invasive species. Aggressive techniques will be employed when competing species are first noticed, to help in controlling the population and to reduce the possibility of any future rehab.

IX. PUBLIC CONTACT:

- Public concern over the increasing number of lakes in Okanogan County with undesirable species infestations prompted this action.
- A public meeting was held in Ephrata on Tuesday, July 15th at 7pm at the WDFW Regional Office. Letters have also been written to each individual landowner.

Initiated by: Region Two Fisheries Management

LAKE MANAGEMENT PLAN

Water: Starzman Lakes

Management Type: Trout Only

Location: 10 miles north of Brewster, Washington lying within Sec 35 and 36, T32N, R24E

Size: 18 acres, maximum depth 26 feet, 252 acre-feet

Water Source: Ground water (underground springs)

Outflow: Intermittent

Management History: Starzman Lakes are year round trout lakes that can provide good fishing for anglers interested in smaller production waters. Standard gear rules apply along with a five fish limit, and most of the fishing effort occurs from shore or in a small non-motorized craft. Fingerling plants of either eastern brook or rainbow trout have normally produced yearling fish in the 11-12 inch range, with carryover fish to 15 inches. Winterkill in the upper lake has occurred at varying degrees of frequency.

However, in recent years, the illegal introductions of bluegill have seriously compromised the trout fishery. Fingerling plants have experienced reduced survival to yearling size and angler effort has dropped substantially. Bluegill populations have increased to the point where trout size has gone from a 12" yearling to 9 inches.

Current Management Objectives: Management at Starzman Lakes should concentrate on a multi-species trout fishery in a small lake setting. Fish planting should be geared toward rainbow and eastern brook trout, which will provide a good variety for anglers.

Fishery Objectives:

<u>Species</u>	<u>Type</u>	<u>Category</u>	<u>Fish/hour</u>	<u>Fish/angler</u>	<u>Ave size</u>
RB/EBT	Production	Standard	1.5	2-3	11"-12"

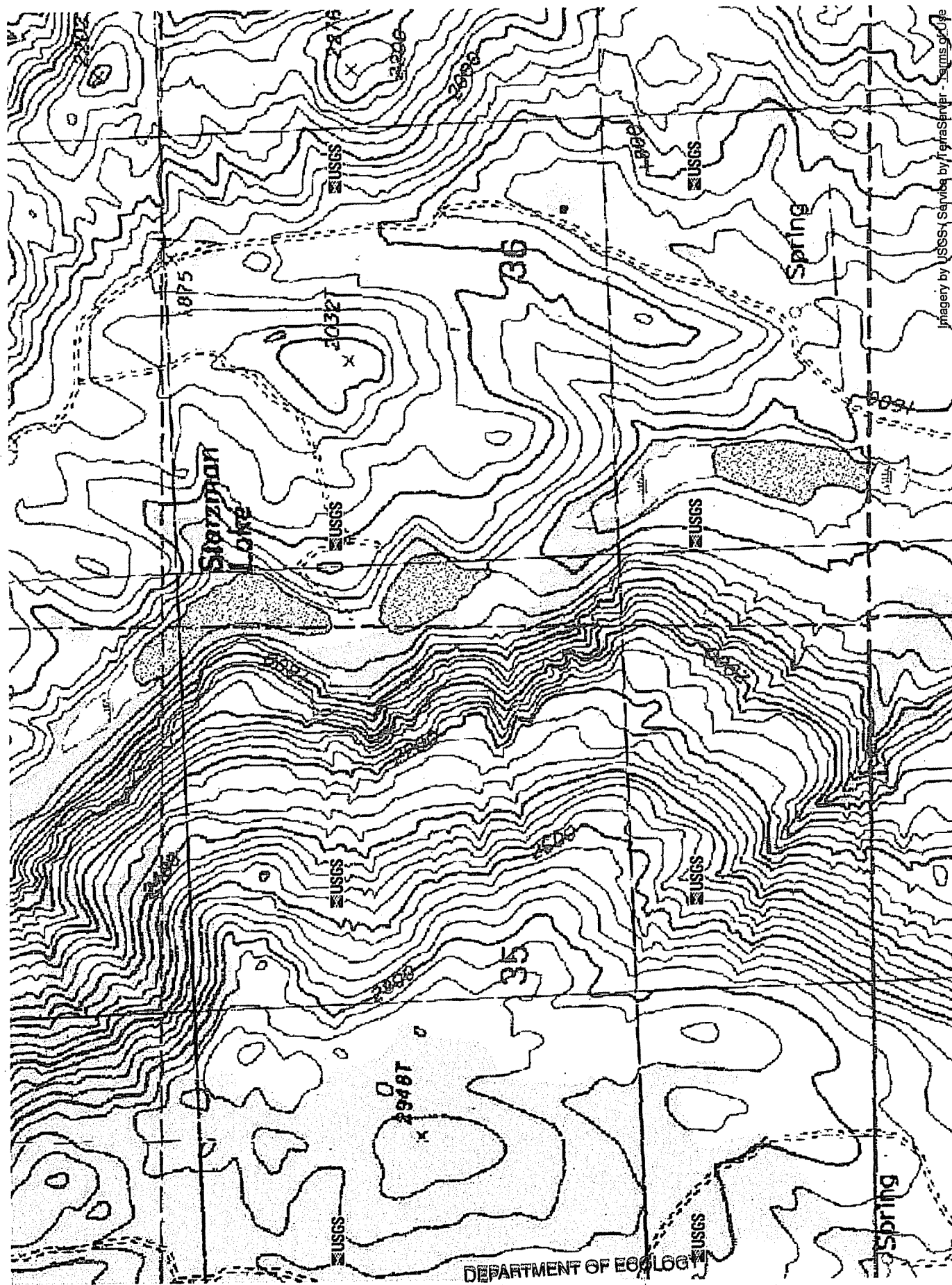
Angler use objective (# angler days): 200

Stocking Objectives:

<u>Lakes</u>	<u>Species</u>	<u>Total Fish</u>	<u>Fish/Acre</u>	<u>Fish/pound</u>	<u>Planting Month</u>
Starzman	RB/EBT	4,000	222	50	Apr/May

Management Strategy:

- Check yearling growth in spring; should be about 11-12 inches, adjust stocking rate and fish size as necessary
- Mix species to provide angler interest
- Monitor angling activity and catch rates periodically throughout season
- Closely monitor any invasive species and react immediately to control population by all means before treating with rotenone (angling, electroshocking, netting, and regulation changes).



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DEPARTMENT OF COMMERCE
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UNITED STATES GOVERNMENT

PRE-REHABILITATION PLAN

Starzman Lakes

I. PROPOSAL

A. Justification for Proposed Rehabilitation

- (1-2) Starzman Lakes are good productive waters that provide a small lake angling experience for float fishermen as well as shore anglers. Surveys indicate illegal plants of bluegill, which have compromised the trout fishery in recent years. Competition from non-native species has reduced the average yearling size of trout from 12 inches to 9 inches. Treatment is necessary to restore the lakes to productive trout only waters.
- (3) Primary management of these waters is for trout only.
- (4) Starzman Lakes were successfully treated in 1981 to remove largemouth bass.

B. Physical Description of Water Proposed for Rehabilitation

- WATER: Starzman Lakes (Upper, Middle, Lower)
- LOCATION: Sec 35 and 36, T32N, R24E, Okanogan Co.
- SURFACE ACRES: 18
- MAX. DEPTH: 26
- VOLUME: 252 acre-feet
- OUTLET: Intermittent
- STREAM: MILES N/A FLOW (cfs)
- PUBLIC ACCESS: Department of Natural Resources
- LAND OWNERSHIP: Public 20% Private 80%;
- ESTABLISHED RESORTS: None

C. Proposed Management Actions

- WATER: Starzman Lakes
- TARGET SPECIES: Sunfish (Bluegill)
- DATE LAST REHABED: 1981
- PROPOSED TREATMENT DATE: Oct 2008
- REPLANTING DATE: Late-spring 2009
- SPECIES: Rainbow/Eastern Brook trout
- STOCKING: 4,000 fingerling trout
- PROPOSED TOXICANT: Rotenone, powder and liquid
- CONCENTRATION: 1 ppm
- AMOUNT (ROTENONE AT 5% ACT. INGRED): 680 lbs, 10 gal liquid
- METHOD OF APPLICATION: pumper boats - slurry and spray; ATV with sprayer; small boat with small sprayer, backpack sprayers
- CREW DESCRIPTION: Leader Robert Jateff, Personnel 6-8

II. PURPOSE:

- Starzman Lakes have been managed as good quality production trout waters since the 1970's. Complete rehabilitation is the only feasible method of restoring these lakes to the trout only management scheme. Removal of all competing species is the goal of the rehabilitation.

III. INTENDED OUTCOME/MEASURE OF SUCCESS:

- We intend to restore Starzman Lakes to its historic trout fishery, and improve its popularity by maintaining good quality trout throughout the duration of the season. Success of this measure will be apparent during annual creel surveys and population sampling. Given a reasonable chance of eliminating the populations of undesirable species, the beneficial effects should be noticeable one-two years post treatment.

IV. RESOURCE IMPACTS:

- Target species: sunfish (bluegill)
- District and Regional Habitat, Wildlife and Non-Game biologists have been appraised of our rehabilitation plans and have no immediate concerns.
- According to Bradbury (1986), the effects of rotenone on benthos are variable, depending on the concentrations and species. Crustaceans are most tolerant while the smaller insects are most affected. Immediate reduction of the population average 25%, and survival doubles when access to bottom sediments exists. Benthic communities generally recover to at least pretreatment levels within two months. Zooplankton is more severely impacted, and communities generally take two to twelve months to fully recover. While relatively tolerant of even heavy doses of rotenone, amphibians (especially larval) are at risk, and herptiles are affected somewhat less so.
- Participation in the trout fisheries should exceed that currently found for existing fisheries. The water in the lake is used for recreation. Dead fish along the shoreline will not be a public nuisance since the lake will be closed to fishing.

V. MITIGATING FOR ADVERSE IMPACTS:

- Trout survival and growth will be greatly enhanced. No removal of dead fish is planned as the nutrient base contained therein is best returned to the lake. Disturbance of waterfowl during treatment or by the anticipated fishery will be offset by increased food availability as the uncontrollable numbers of spiny-rayed fishes are eliminated in favor of easily balanced populations of trout.
- Water will be confined to the lake proper, and treatment will be conducted in the fall when the lake is at its lowest level.
- Protective gear for the eyes, face, hands and clothes will be supplied on-site for all purveyors of rotenone.
- The lake will be posted according to Department of Ecology guidelines to notify the public of the treatment and discourage the public from possessing or consuming dead fish. The landowners will be notified of the rehabilitation and consequent exposure of livestock to rotenone.

VI. RECREATIONAL IMPACT: also see I.A., II and III

- Recreational angling opportunity will be increased if the undesirable species are removed from Starzman Lakes. The level of participation will dwindle to almost nothing if no action is taken immediately. Given the success of the planned management action, as

many as 200 fishing days are estimated for the season. Anglers should average 2-3 fish per day within the 11"-12" range.

VII. ECONOMIC IMPACTS:

- Rehabilitation would restore the fishery and associated economic activity. An estimated 200 angler trips will be made to Starzman Lakes as a result of the proposed management action, with an economic impact of \$26,400 per year (2004 dollars; based on WDW estimate of \$132 per trip). Fingerling plants will cost the agency \$560, and can be easily accomplished under current hatchery programs.
- The cost of treatment will be approximately \$2,000, but the increase in license sales and subsequent boost to the local economy will more than offset that loss within two-three years after treatment.

VIII. RELATED MANAGEMENT ACTION:

- Approximately 4,000 fingerling rainbow/eastern brook trout will be stocked alternately each spring. Creel checks will be done annually on Starzman Lakes, as well as monitoring for invasive species. Aggressive techniques will be employed when competing species are first noticed, to help in controlling the population and to reduce the possibility of any future rehab.

IX. PUBLIC CONTACT:

- Public concern over the increasing number of lakes in Okanogan County with undesirable species infestations prompted this action.
- A public meeting was held in Ephrata on Tuesday, July 15th at 7pm at the WDFW Regional Office. Letters have also been written to each individual landowner.

Initiated by: Region Two Fisheries Management

STREAM MANAGEMENT PLAN

Updated June, 2008 – C. Donley

Water: Cee Cee Ah Creek (Pend Oreille Co.)

Location: Cee Cee Ah Creek is located 10 miles north of Usk, Washington. The outlet to the Pend Oreille River is located on the Kalispel Indian Reservation.

Reach Length:	Flow(cfs):	Velocity (m/s):
5.15 miles	.80*	.027*

*Flow and Velocity measurements were taken in Fall 2007. Flow and velocity will be determined prior to treatment during late Summer 2008.

Water Source: Snowmelt and rainwater

Tributary status: Cee Cee Ah creek is a second order tributary to the Pend Oreille River.

Management History:

The decline and extinction of native populations of cutthroat trout throughout the western United States are often associated with the introduction of nonnative salmonids.

Stocking of nonnative salmonids (primarily brook trout) in Pend Oreille River tributaries has occurred since 1933. Competition and displacement by brook trout appear to be the primary impacts to native westslope cutthroat trout populations in Cee Cee Ah Creek and other Pend Oreille River Tributaries. Since 1995, KNRD has sampled 274 sites in Pend Oreille River tributaries; westslope cutthroat trout were observed in only 50% of the sites. Of the 137 sites where westslope cutthroat trout were present, 45 (33%) of the sites contained isolated allopatric populations. Mean cutthroat trout density in allopatric sites (mean 14.4 fish/100m²) was significantly greater than westslope cutthroat density in sites sympatric with brook trout (mean 4.4 fish/100m², $P < 0.001$ by t test).

Because of negative interactions with brook trout, westslope cutthroat trout may have recently been extirpated in a handful of tributary streams to the Pend Oreille River. A survey conducted in 1996 in upper Cee Cee Ah Creek found 1 cutthroat trout and 118 brook trout in six 30 meter snorkeling stations. In seven years of snorkeling to monitor habitat enhancement sites, KNRD observed only 3 cutthroat trout while brook trout numbered 1,767. Finally, in 2002 KNRD crews electrofished upper Cee Cee Ah Creek to obtain cutthroat trout samples for genetic analysis; despite a comprehensive effort that extended into the headwaters beyond occupied habitat, no cutthroat trout were captured.

The extirpation of westslope cutthroat from Cee Cee Ah creek is likely the result of an expanding brook trout population. In an attempt to reverse the downward trend in westslope cutthroat populations the upper 5 miles of Cee Cee Ah Creek will be treated with rotenone to eliminate brook trout and a native westslope cutthroat trout population will be re-established.

T&E Flora and Fauna: Professionals from many resource agencies have visited this site countless times during the last 50 years. No known report exists of any threatened or endangered species habitually found in or near these lakes. Occasional visits from both bald and golden eagles occur, although no nests of these two species are known in the area. Protected species of waterfowl and other birds frequently are found here at times, as well.

Current Management Objectives:

Cee Cee Ah Creek is managed on the statewide stream opener (June 1). Harvest limits are, brook trout, daily limit 5, no minimum length; cutthroat trout, daily limit 2, minimum length 8 inches.

1. Fishery Objectives:

Objective: Establish a self-sustaining, utilizable westslope cutthroat population in upper Cee Cee Ah Creek.

This project is a model project; specific objectives for fish abundance and harvest will be determined following long term monitoring and evaluation. Initially the stream will be closed to angling to allow for monitoring and evaluation of population development without harvest. The stream will eventually reopen to angling following population recovery.

2. Angler use objective: See Above

3. Stocking Objectives:

This project is a model project to determine the efficacy of removing brook trout from Pend Oreille River tributaries using rotenone, and reestablishing native westslope cutthroat trout. WDFW and KNRD will decide the appropriate stock and density of westslope to stock following implementation of the rotenone treatment. The appropriate stock and density will be determined by no later than Fall 2010.

Management Strategies:

1. Treat stream with rotenone
2. Monitor stream during spring summer 2009 for fish presence. If brook trout are still present retreat stream with rotenone to eliminate remaining nonnative fishes.

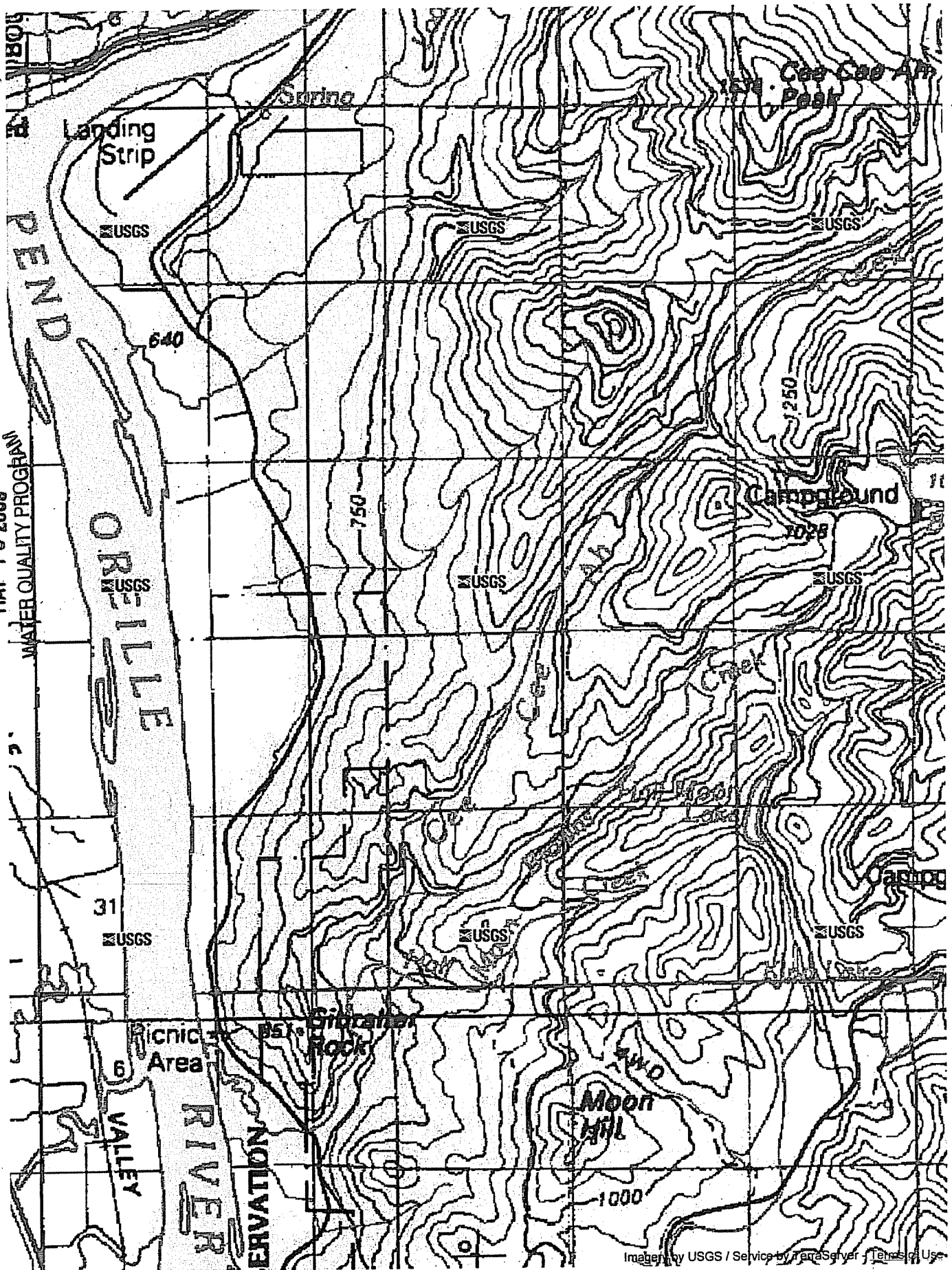
3. Set up monitoring and Evaluation plan in cooperation with KNRD, Determine proper stock and density of westslope cutthroat for reestablishing population (work completed no later than Fall 2010).
4. Stock appropriate stock and density westslope cutthroat trout.
5. Implement Monitoring and Evaluation plan.
6. Develop long term management plan based on Monitoring and Evaluation findings.

CEE-CEE-AH CREEK, PEND OREILLE CO.

DEPARTMENT OF ECOLOGY

MAY 15 2008

WATER QUALITY PROGRAM



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PRE-REHABILITATION PLAN

Cee Cee Ah Creek (Pend Oreille County)

I. PROPOSAL

A. Justification for Proposed Rehabilitation

The Washington Department of Fish and Wildlife (WDFW) and Kalispel Natural Resource Department (KNRD) propose to eradicate nonnative fishes in Cee Cee Ah Creek to restore a native fish species assemblage.

The decline and extinction of native populations of cutthroat trout throughout the western United States are often associated with the introduction of nonnative salmonids.

Stocking of nonnative salmonids (primarily brook trout) in Pend Oreille River tributaries has occurred since 1933. Competition and displacement by brook trout appear to be the primary impacts to native westslope cutthroat trout populations in Cee Cee Ah Creek and other Pend Oreille River Tributaries. Since 1995, KNRD has sampled 274 sites in Pend Oreille River tributaries; westslope cutthroat trout were observed in only 50% of the sites. Of the 137 sites where westslope cutthroat trout were present, 45 (33%) of the sites contained isolated allopatric populations. Mean cutthroat trout density in allopatric sites (mean 14.4 fish/100m²) was significantly greater than westslope cutthroat density in sites sympatric with brook trout (mean 4.4 fish/100m², $P < 0.001$ by t test).

Because of negative interactions with brook trout, westslope cutthroat trout may have recently been extirpated in a handful of tributary streams to the Pend Oreille River. A survey conducted in 1996 in upper Cee Cee Ah Creek found 1 cutthroat trout and 118 brook trout in six 30 meter snorkeling stations. In seven years of snorkeling to monitor habitat enhancement sites, KNRD observed only 3 cutthroat trout while brook trout numbered 1,767. Finally, in 2002 KNRD crews electrofished upper Cee Cee Ah Creek to obtain cutthroat trout samples for genetic analysis; despite a comprehensive effort that extended into the headwaters beyond occupied habitat, no cutthroat trout were captured.

The extirpation of westslope cutthroat from Cee Cee Ah creek is likely the result of an expanding brook trout population. In an attempt to reverse the downward trend in westslope cutthroat populations the upper 5 miles of Cee Cee Ah Creek will be treated with rotenone to eliminate brook trout and a native westslope cutthroat trout population will be re-established.

B. Physical Description of Water Proposed for Rehabilitation

1. WATER: Upper Cee Cee Ah Creek
2. LOCATION: Sec 1, 11, 12, 14, 15, 21, 22, 28 T34N R44E, Pend Oreille Co.
3. REACH LENGTH: 5.15 miles
4. FLOW (cfs): ≤ 1 cfs FLOW VELOCITY: .027 m/s mean velocity. Some areas have higher and lower velocities based on gradient.
5. BARRIERS: Yes – barrier falls will be the bottom of treatment reach. Detoxification will occur at the barrier falls using potassium permanganate.
6. 7. PUBLIC ACCESS: Yes
8. LAND OWNERSHIP: PRIVATE 20% (Commercial timber lands) PUBLIC 80% (U.S. Forest Service)

C. Proposed Management Actions

1. WATER: Upper Cee Cee Ah Creek
2. TARGET SPECIES: brook trout
3. DATE LAST REHABED: Never
4. PROPOSED TREATMENT DATE: Stream reach will be treated twice in September 2008.
Treatments will be two weeks apart.
5. REPLANTING DATE: To be determined based on consultation with co-managers.
6. SPECIES: Native westslope cutthroat trout
7. PROPOSED TOXICANT: Rotenone, liquid CONCENTRATION: 0.5 to 1 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): approx. 20 gal. – 10 gallons per treatment:
Actual amount of rotenone used will be determined prior to project based on flow volume and velocity.
PROPOSED DETOXICANT: Potassium permanganate
AMOUNT: 50 lbs – Actual amount of permanganate used will be prescribed after determination of flow volume, velocity and biological organic demand.
8. METHOD OF APPLICATION: drip can, backpack sprayer
9. CREW DESCRIPTION: Leader(s) Chris Donley, Personnel ~ 35

II. PURPOSE:

The Washington Department of Fish and Wildlife and Kalispel Natural Resource Department see a need to eradicate non-native fishes in streams flowing into the Pend Oreille River to restore native fish assemblages. Westslope cutthroat are disappearing in their native range partly because of interspecific competition with non-native brook trout. Removing brook trout from Cee Cee Ah Creek will eliminate a limiter to producing a healthy self-sustaining westslope cutthroat trout population.

III. INTENDED OUTCOME/MEASURE OF SUCCESS:

WDFW and KNRD intend to restore a self-sustaining, utilizable population of native westslope cutthroat trout in upper Cee Cee Ah Creek.

IV. RESOURCE IMPACTS:

1. The population of the target species, brook, will be severely and negatively impacted. The aforementioned species are an exotic species that is not desired for the fish population under the current management direction.
2. U.S. Forest Service, private commercial timber companies, and the WDFW Regional Lands, Habitat, Wildlife and Non-Game managers have been appraised of our rehabilitation plans. No unmitigated concerns have been expressed on the potential impacts to non-targeted species.
3. According to Bradbury (1986), the effects of rotenone on benthos are variable, depending on the concentrations and species. Crustaceans are most tolerant while the smaller insects are most affected. Immediate reduction of populations averages 25%, and survival doubles when access to

bottom sediments exists. Benthic communities generally recover to at least pretreatment levels within two months. Zooplankton is more severely impacted, and communities generally take two to twelve months to fully recover. While relatively tolerant of even heavy doses of rotenone, amphibians (especially larval) are at risk, and herptiles are affected somewhat less so. Almost no chance of eliminating an entire population exists.

4. During treatment the stream will be closed to angling, and other recreational uses such as boating, and swimming will be curtailed during the planned period of treatment. There will be no loss of a desired fishery associated with our activities. The native westslope population will be re-established by 2011, but angling for this section of stream will be affected for several years post implementation.

5. Professional biologists and other naturalists have visited these sites frequently over the past 40 years. To our knowledge, no endemic, rare, threatened or otherwise listed species will be impacted by the rehabilitation.

V. MITIGATING FOR ADVERSE IMPACTS:

1. Westslope cutthroat trout recruitment and growth for the proposed water will be greatly enhanced. No removal of dead fish is planned as the nutrient base contained therein is best returned to the stream.

2. Livestock use of the waters to be treated will not be significantly affected. The concentration of rotenone used in the treatment will be far below that considered harmful to mammals. The landowners or lessees will be notified of the rehabilitation and consequent exposure of livestock to rotenone.

4. No endemic, rare, threatened or otherwise listed species are known to inhabit this area.

5. Protective wear for the eyes, face and hands will be available for all purveyors of rotenone.

6. Stream reach will be posted according to Department of Ecology guidelines to notify the public of the treatment and discourage the public from possessing or consuming dead fish.

VI. RECREATIONAL IMPACT:

Current recreational fishery use for this reach of stream is negligible. The overall loss to recreational angling does not cause enough concern to generate a need for mitigating the loss. There are hundreds of miles of remaining fish bearing streams and multiple lakes in the area stocked with trout by WDFW to absorb the loss of five miles of stream reach from the recreational fishery until a harvestable population of cutthroat is restored.

VII. ECONOMIC IMPACTS:

None to Negligible economic impacts.

VIII. RELATED MANAGEMENT ACTION:

Post treatment there will be fish presence/absence surveys conducted during field season 2009 to determine the efficacy of the treatment. If no brook trout are found the project will move on the reintroduction of westslope cutthroat trout. If there are brook trout remaining, the stream will be treated with rotenone again in 2009.

Post treatment(s) WDFW and KNRD will determine the stock and stocking density of westslope cutthroat trout that is appropriate to reestablish the fish population in upper Cee Cee Ah Creek. Westslope cutthroat trout will be reintroduced by Spring 2011 at the latest.

IX. PUBLIC CONTACT:

Public meetings will be held during July 2008 in Spokane, Colville, Ephrata and Olympia to explain WDFW's 2008-09 rehabilitation proposals, assess public opinion, and address local concerns.

Additional meetings to specifically discuss the Cee Cee Ah Creek restoration project are planned. From 3-5 pm on July 23rd at the Cusick Community Center, 107 1st Ave in Cusick, WDFW and KDNR staff will give a Presentation on the project to the Pend Oreille Count Parks and Recreation Board. On July 30th from 6:30-8:30 pm, a public meeting will be held at Cusick Community Center to provide information on the project to the community and to answer questions.

Initiated by: Region One, District 2 Fisheries Management

LAKE MANAGEMENT PLAN

Updated June, 2008 – C. Donley

Water: Frater Lake (Pend Oreille Co.)

Location: Frater Lake is located 6.5 miles south of Ione. Frater Lake has an intermittent drainage to Leo Lake and is the northern most lake in the Little Pend Oreille Chain Lakes.

	Size:	Max. Depth:	Volume:
Frater Lake	15 acres	15 ft	90 acre feet

Water Source: Mostly groundwater seeps, with limited overland flow. Intermittent creek flows all but the driest of years.

Outflow: Intermittent outflow leading to Leo Lake part of the Pend Oreille Chain Lakes and eventually to the Little Pend Oreille River.

Management History:

Frater Lake has been managed since the 1950s as production westslope cutthroat water. The lake has been managed as a lowland lakes opener, but typically because of its elevation and aspect late May and June are the most productive fishing months. This lake is known to have rapid growth rates for fall fingerling stocked cutthroat, with age 2 fish reaching 14 inches. Because of its small size and proximity to highway 20 very few fish carry-over past age 2.

For many years Frater Lake provided an excellent fishery despite the fact that the lake had a population of competing pumpkinseed sunfish. Lake productivity, and the fact that the sunfish population was not expanding rapidly, allowed for continued successful fish management. The sunfish were in the lake for at least 20 years prior to them reaching a density that negatively affected the recruitment and harvest of cutthroat trout. By 2006, densities of pumpkinseed sunfish had developed sufficiently to preclude cutthroat recruitment, and stocking of cutthroat in this water was suspended. The origin of pumpkinseed sunfish in this water is unknown, but it is likely that they were illegally introduced some time in the past 30 years. Historically this lake had been treated with rotenone (1952, 1960, 1968) but the treatments were done to eradicate tench and reidside shiner. There are current reports of tench in this water, but there numbers are believed to be considerably lower than pumpkinseed sunfish.

T&E Flora and Fauna: Professionals from many resource agencies have visited this site countless times during the last 50 years. No known report exists of any threatened or endangered species habitually found in or near these lakes. Occasional visits from both bald and golden eagles occur, although no nests of these two species are known in the area. Protected species of waterfowl and other birds frequently are found here at times, as well.

Current Management Objectives:

Frater Lake is a lowland lake opener, last Saturday in April to October 31, production fishery. Five fish limit, no size or gear restrictions. Provide 2 to 5 westslope cutthroat trout per angler trip with a carryover harvest rate of 0 to 5 percent. Fishery should generate a minimum of 1,000 angler-trips per season.

1. Fishery Objectives:

Species	Type	Category	Fish/Hour	Fish/Angler	Exploit. Rate
Cutthroat	Production	Opening Day	1	1 to 3	95%-100% 2 yr cohort
Cutthroat	Production	Remainder of season	1.5	2 to 5	95%-100% 2 yr cohort

2. Angler use objective (# angler days): Season – 1,000 angler days on water

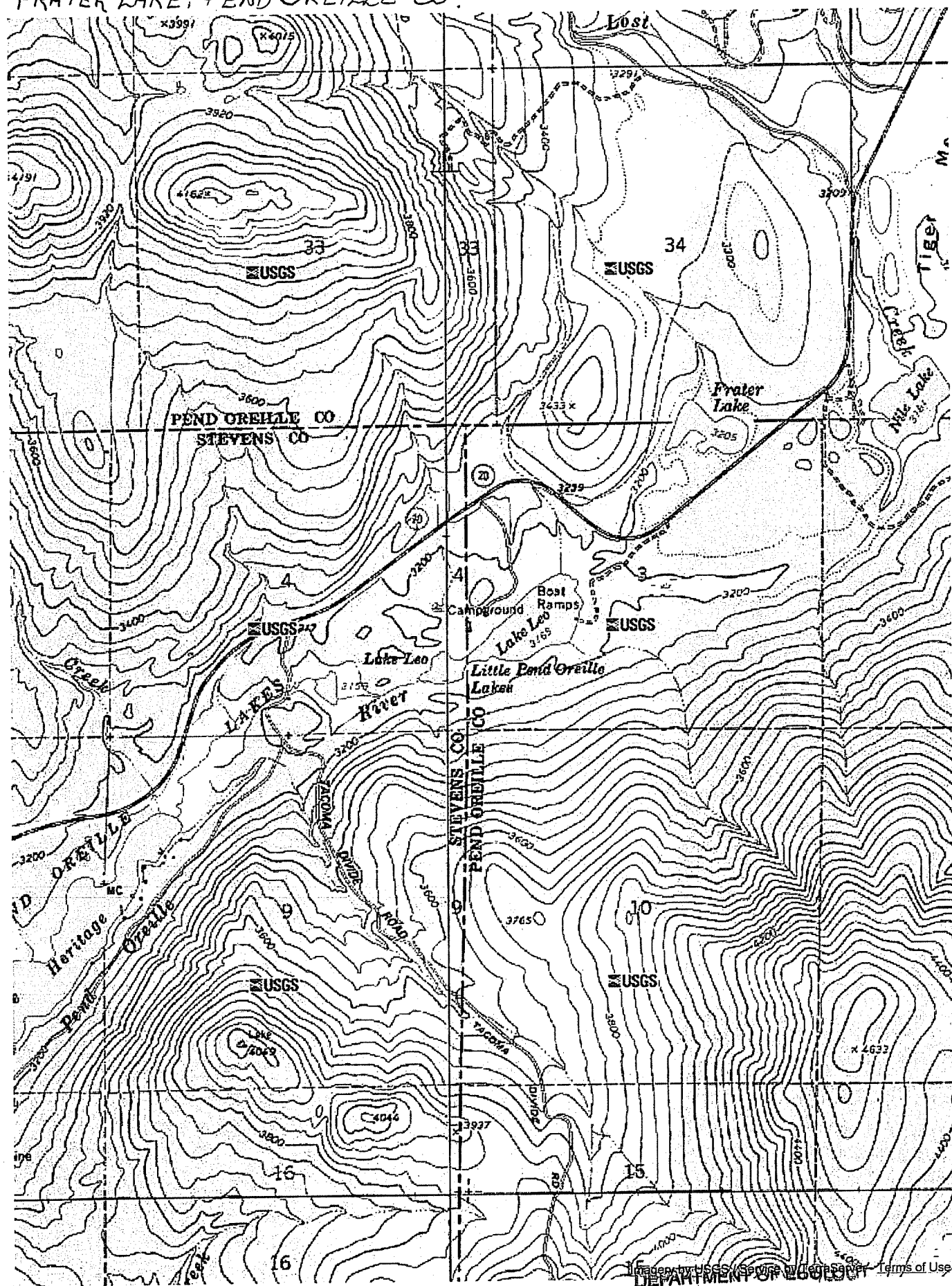
3. Stocking Objectives:

<u>Lake</u>	Species	Number of Fish Stocked			Planting Month
		Total	/Acre	/Pound	
Frater- year 1	Cutthroat	2500	166	<20	April-May
Year 2	Cutthroat	5000	333	<150	October
Year 3	Cutthroat	5000	333	<150	October
Year 4	Cutthroat	5000	333	<150	October
Year 5	Cutthroat	5000	333	<150	October

Management Strategies:

- Plant westslope cutthroat spring fry for the first year following rehab and then fall fry in October in successive years following rehab. Fall fry are more cost effective and proven at providing successful fisheries in District 1 waters.
- Check yearling growth; should be about 11 inches, adjust stocking rate as necessary.
- Harvest 95%- 100% of age 2 fish by end of season.
- Monitor all fish species periodically by electrofishing or netting.
- Control undesirable species with rotenone when trout survival is inadequate to produce an acceptable fishery.

FRATER LAKE, PEND OREILLE CO.



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DEPARTMENT OF LOGISTICS

MAY 15 2008

2000-01-01

2000-01-01

2000-01-01

PRE-REHABILITATION PLAN

Frater Lake (Pend Oreille County)

I. PROPOSAL

A. Justification for Proposed Rehabilitation

Frater Lake has historically been a popular Lowland Lake Opener westslope cutthroat trout fishery in the Colville area. Although the lake is typically iced over or too cold to fish on the last Saturday in April it tends to provide excellent fishing throughout the late spring and summer, filling a niche left behind by lakes that have warmed too much, precluding good trout fishing at lower elevations. Having a lake that provides fishing later into the spring and summer provides for more and varied opportunity for anglers looking to pursue trout in eastern Washington.

Frater was last rehabilitated in 1968 to rid the lake of tench. Since that time it has had low-level infestations of tench and pumpkinseed sunfish, but has consistently produced an excellent cutthroat fishery. In the past decade, cutthroat recruitment steadily declined until stocking was suspended in the fall of 2006. Pumpkinseed sunfish densities increased substantially over the past ten years leading to higher interspecific competition, thus precluding recruitment of cutthroat into the fish population of Frater Lake. Through the use of rotenone to rehabilitate the lake, it is anticipated that this lake will return to a productive westslope cutthroat trout fishery.

B. Physical Description of Water Proposed for Rehabilitation

1. WATER: Frater Lake

2. LOCATION: Sec 34, T37N R42E Pend Oreille County

3. SURFACE ACRES: 15 MAXIMUM DEPTH: 15ft

4. VOLUME: 90 acre-feet; 244,800,000 lbs H₂O

5. OUTLET: Yes

6. STREAM: Intermittent stream flows to Leo Lake/Pend Oreille Chain Lakes. If intermittent channel is not dry, rotenone treatment will be suspended until there is no flow to Leo Lake.

7. PUBLIC ACCESS: Yes

8. LAND OWNERSHIP: PUBLIC 100% (U.S. Forest Service)

9. ESTABLISHED RESORTS: None on lake

C. Proposed Management Actions

1. WATER: Frater Lake

2. TARGET SPECIES: pumpkinseed sunfish, tench

3. DATE LAST REHABED: October 1968

4. PROPOSED TREATMENT DATE: September-November, 2008

5. REPLANTING DATE: Spring 2009

6. SPECIES: westslope cutthroat trout

7. FINGERLINGS: 5,000-6,000 at 200 fish per pound

8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 1 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 480 lbs., 5 gal.

9. METHOD OF APPLICATION: pumper boat slurry and airboat spray

10. CREW DESCRIPTION: Leader(s) Chris Donley, Personnel ~ 6

II. PURPOSE:

The Washington Department of Fish and Wildlife (DFW) provides many types of fisheries in response to public desires. WDFW manages both trout and warmwater recreational fisheries based on many different species of fish and levels of difficulty. Public demand for and participation in production trout fisheries is high. These fisheries are prized as opportunities for families to recreate together, as well as providing an appropriate challenge for occasional or novice anglers. Lowland Lakes Opening Day trout fisheries provide a relaxed recreational opportunity, give anglers outdoor opportunity during the spring, summer and fall months, and are also integral to the state and local economies.

Alternatives to rehabilitation are costly or impractical. To maintain a comparable fingerling-stocked trout fishery in these waters with catchable-sized fish would take 2,500 – 3,500 catchable westslope cutthroat trout. Stocking catchable sized cutthroat costs almost 20 times the cost of a fall fry plant, and Region One lacks the hatchery space and water to institute a westslope cutthroat catchable fish-stocking program as a substitute for lake rehabilitation. Fall cutthroat fry survival in lakes free of competing species ranges from 50-80 percent. Regardless of fish size at stocking, interspecific competition with warmwater fishes limits fish growth and condition significantly. Ultimately, trout recruitment and fish quality lead to an undesirable trout fishery.

III. INTENDED OUTCOME/MEASURE OF SUCCESS:

WDFW intends to restore Frater Lake to a popular, easily accessible cutthroat fishery based on fingerling-stocked trout. The average catch rates should be 3 to 5 fish/angler on the opener with a sustained harvest of 2 to 3 fish/angler for the duration of the season. Fall fry should be a minimum of 11 inches as yearlings, and carryover harvest should be 0 to 5 percent of the overall harvest. Success will be measured during Opening Day and random creel contacts and biological surveys. Given a reasonable chance of reducing the populations of undesirable species dramatically, the beneficial effects should last approximately 10 to 12 years under current management schemes. In addition to reasons listed under Resource, Recreational and Economic Impacts, to abandon this lake as a trout fishery is to invite other incursions across the state in trout-only managed lakes.

IV. RESOURCE IMPACTS:

1. The population of the target species, largemouth bass and green sunfish, will be severely and negatively impacted. The aforementioned species are an exotic species that is not desired for a fishery under the current lake management plan.
2. Regional Lands, Habitat, Wildlife and Non-Game managers have been appraised of our rehabilitation plans. No unmitigated concerns have been expressed on the potential impacts to non-targeted species.
3. According to Bradbury (1986), the effects of rotenone on benthos are variable, depending on the concentrations and species. Crustaceans are most tolerant while the smaller insects are most affected. Immediate reduction of populations averages 25%, and survival doubles when access to bottom sediments exists. Benthic communities generally recover to at least pretreatment levels

within two months. Zooplankton is more severely impacted, and communities generally take two to twelve months to fully recover. While relatively tolerant of even heavy doses of rotenone, amphibians (especially larval) are at risk, and herptiles are affected somewhat less so. Almost no chance of eliminating an entire population exists.

4. During treatment the lake will be closed to angling, and other recreational uses such as boating, and swimming will be curtailed during the planned period of treatment. There will be no loss of a fishery associated with our activities. Ellen Lake will be stocked to provide a fishery with catchable sized rainbow trout in the spring of 2009 prior to the Lowland Lakes Opening Day.

5. Professional biologists and other naturalists have visited these sites frequently over the past 40 years. To our knowledge, no endemic, rare, threatened or otherwise listed species will be impacted by the rehabilitation.

V. MITIGATING FOR ADVERSE IMPACTS:

1. Trout fry survival and growth for the proposed water will be greatly enhanced, and the future trout fishery will attain the previous status. No removal of dead fish is planned as the nutrient base contained therein is best returned to the lake.

2. Fall rehabilitation will not interfere with waterfowl spring nesting. The eradication of largemouth bass and green sunfish will also benefit waterfowl through increased production of invertebrates. Stocked populations of trout will not be anywhere near as numerous as the current largemouth bass and green sunfish population.

3. Livestock use of the waters to be treated will not be significantly affected. The concentration of rotenone used in the treatment will be far below that considered harmful to mammals. The landowners will be notified of the rehabilitation and consequent exposure of livestock to rotenone.

4. No endemic, rare, threatened or otherwise listed species are known to inhabit this area.

5. Protective wear for the eyes, face and hands will be available for all purveyors of rotenone.

6. Lakes will be posted according to Department of Ecology guidelines to notify the public of the treatment and discourage the public from possessing or consuming dead fish.

VI. RECREATIONAL IMPACT:

See Section III.

Angler success should reach three to five fish per trip on the opener and 2-3 fish/angler sustained harvest for the duration of the season. Yearling trout should average about 11 inches. Carryovers should be expected to be about 10 to 15 percent of the catch and average 13 inches for 2-year-olds and 16 inches for 3-year-olds.

VII. ECONOMIC IMPACTS:

An estimated minimum of 1,000 trips made to Frater Lake as a result of the proposed management action would result in an increased economic impact totaling \$37,900 per year (1991 dollars; based WDW estimate of \$37.90 per trip). If the project is successful for 10 years it will generate a minimum of \$379,000 in economic activity. The total annual cost to plant these lakes with cutthroat trout fry is less than \$1,000. The rehabilitation will cost the Department about \$15,000 (including costs of rotenone, time, travel).

Estimates for the cost of the enforcement action necessary to curtail the activity of the individuals responsible for illegal fish plants are not available. However, this cost might be looked upon as a statewide expenditure since some preventive benefit would certainly occur as perpetrators find out the Department takes illegal transport and planting of fish very seriously.

VIII. RELATED MANAGEMENT ACTION:

See I.C.6. for fish planting data

Increased penalties and enforcement activities are desirable if WDFW is ever going to dissuade illegal stocking of state managed waters. Educating the public about the costs in Department dollars and time with emphasis on what WDFW might be able to accomplish with those resources would be a very worthwhile activity for O & E. This may result in stemming recruitment to this ill advised group and turning local opinion against the offenders.

IX. PUBLIC CONTACT:

Public meetings will be held during July 2008 in Ephrata, Spokane, Colville and Olympia to explain WDFW's 2008-09 rehabilitation proposals, assess public opinion, and address local concerns.

Initiated by: Region One, District 2 Fisheries Management

LAKE MANAGEMENT PLANS

Updated June, 2008 – C. Donley

Waters: Hatch Lake, Little Hatch Lake, Keogh Lake

Location: Hatch and Little Hatch Lakes are 5.25 miles southeast from Colville, Keogh Lake is .75 miles to the north of Hatch Lake.

	Size:	Max. Depth:	Volume:
Hatch	34 acres	34 ft	540 acre feet
Little Hatch	14 acres	10 ft	74 acre feet
Keogh	18 acres	60 ft	668 acre feet

Water Source: Mostly groundwater seep, with limited overland flow. There is no defined intermittent or year-round stream that feeds into these lakes.

Outflow: Intermittent outflow leading to adjacent wetlands. Outflow will be dry during time of treatment.

Management History:

Hatch Lake has been historically managed as production winter season trout fishery. Since the 1960s, Hatch Lake has provided a consistent winter ice fishery that has been popular for all of the greater Colville to Spokane angling base. The number of winter only fisheries in the greater Spokane area is limited to four production trout lakes. The limited amount of winter fishing opportunity renders Hatch Lake highly desirable to provide wintertime recreation. The presence of undesirable species of fish is the greatest impediment to maintaining trout fisheries in this water. Yellow perch and other warmwater species were introduced, probably illegally, into the system during the early 1960s, and six rehabilitations (1963,1971,1978,1988,1995,1999) have failed to eradicate these species.

Little Hatch and Keogh lakes are privately owned waters. Historically, they have been rehabilitated to prevent the re-introduction of undesirable species into Hatch Lake. Generally, in exchange for using rotenone on the private lakes WDFW will do the initial restocking of Little Hatch and Keogh Lakes. There are no management or harvest objectives for these private waters.

T&E Flora and Fauna: Professionals from many resource agencies have visited this site countless times during the last 50 years. No known report exists of any threatened or endangered species habitually found in or near these lakes. Occasional visits from both bald and golden eagles occur, although no nests of these two species are known in the area. Protected species of waterfowl and other birds frequently are found here at times, as well.

Current Management Objectives:

Hatch Lake is a winter opener, December 1 to March 31, production fishery. Five trout limit, no size or gear restrictions. Provide 2 to 5 rainbow trout per angler trip with a carryover harvest rate of 10 to 15 percent. Fishery should generate a minimum of 2,500 angler-trips per season.

1. Fishery Objectives:

Species	Type	Category	Fish/Hour	Fish/Angler	Exploit. Rate
Rainbow	Production	Opening Day	2	3 to 5	85%- 90% 1 yr cohort
Rainbow	Production	Remainder of season	1	2 to 3	85%-90% 1 yr cohort

2. Angler use objective (# angler days): Season – 2,500 angler days on water

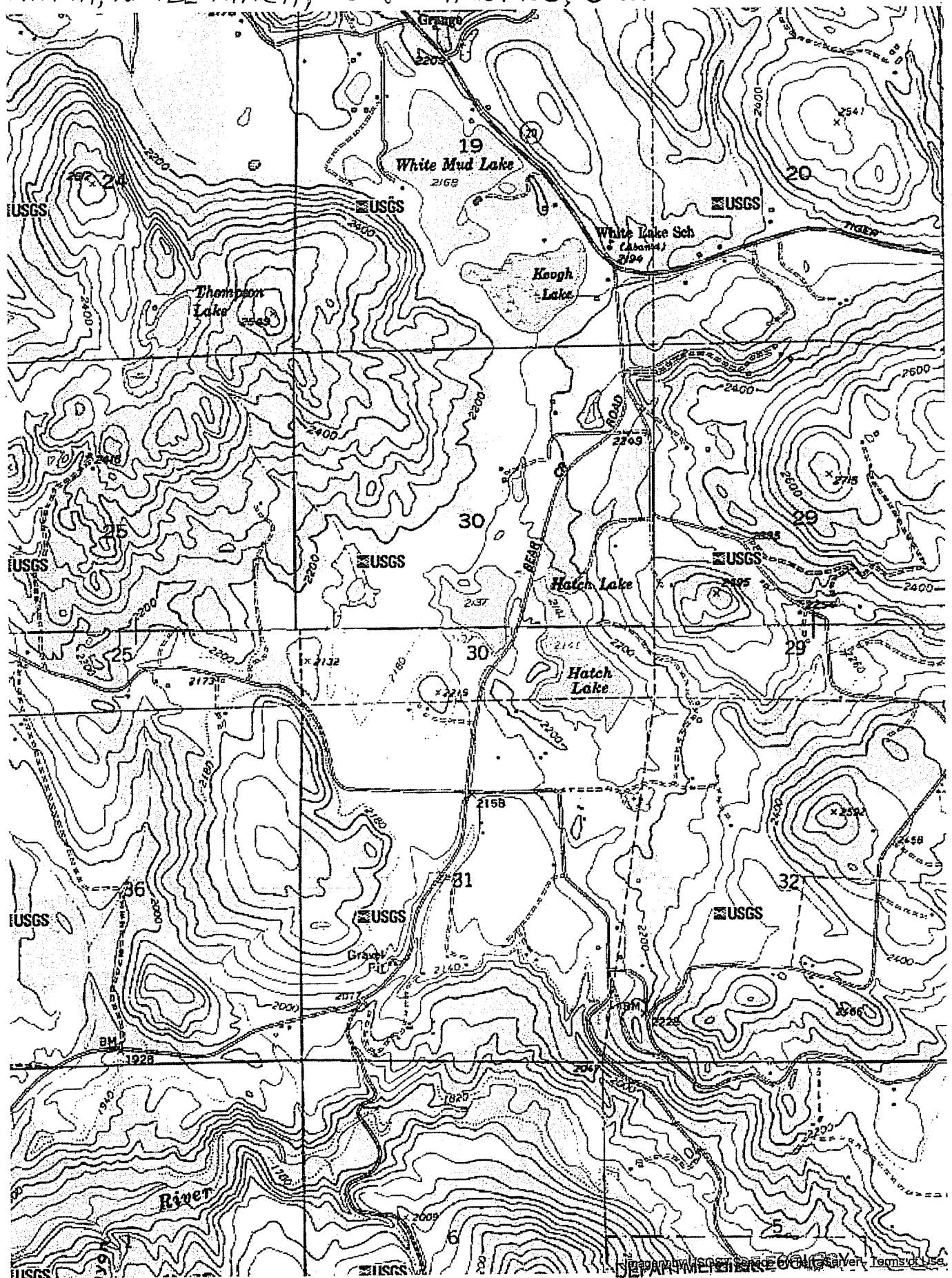
3. Stocking Objectives:

<u>Lake</u>	Species	Number of Fish Stocked			Planting Month
		Total	/Acre	/Pound	
Hatch - Year 1	Rainbow	10,000	294	<100	April-May
	Rainbow	3,500	102	≤ 5	March-April, <i>first year post rehabilitation</i>
Year 2	Rainbow	10,000	294	<100	April-May
Year 3	Rainbow	10,000	294	<100	April-May
Year 4	Rainbow	10,000	294	<100	April-May
Year 5	Rainbow	10,000	294	<100	April-May
Little Hatch	Rainbow	2,000		<100	April-May
	Rainbow	500		≤ 5	March-April, <i>first year post rehabilitation</i>
Keogh	Rainbow	5,000		<100	April-May
	Rainbow	500		≤ 5	March-April, <i>first year post rehabilitation</i>

Management Strategy:

- Plant rainbow fry and catchables in spring.
- Check yearling growth; should be about 11 inches, adjust stocking rate as necessary.
- Harvest 85%- 90% of yearling fish by end of season.
- Monitor all fish species periodically by electrofishing or netting.
- Control spiny-ray species with rotenone when trout survival is inadequate to produce an acceptable fishery.

HATCH, LITTLE HATCH, AND KEOGH LAKES, STEVENS CO.



MAY 15 2008

THE UNIVERSITY OF CHICAGO

JOHN F. YAM

1967-1970, 1971-1972, 1973-1974

PRE-REHABILITATION PLAN

Hatch Lake, Little Hatch Lake and Keogh Lake

I. PROPOSAL

A. Justification for Proposed Rehabilitation

Hatch Lake has historically been a popular winter trout fishery in the Colville area. Illegal introductions of yellow perch have plagued trout production on this lake for the past 20 plus years. Through regulation modification and the use of rotenone to rehabilitate the lake, it is anticipated that this lake will return to a productive winter trout fishery.

Hatch, Little Hatch and Keogh Lakes have been illegally stocked with yellow perch. These illegal stockings have occurred multiple times since the early 1960s. The frequency of illegal stockings has increased in the past two decades making for difficult trout management in these lakes. The resulting perch populations in these lakes provide two to three years of desirable fishing before stunting occurs and the lakes are no longer viewed as desirable fisheries for perch or trout. At the point where the perch become stunted, WDFW will again rehabilitate the lake and restock with trout, only to watch the perch cycle start again from illegal introduction. Apparently, there are anglers that have discovered that following rotenone treatment they can illegally plant perch and profit from an expanding perch population for several years prior to them stunting. To combat these "bucket biologists" WDFW enacted the regulation on Hatch Lake to make it "catch and release except for trout". The intent of the new regulation was to make harvesting any species from the lake other than trout illegal. Thus, preventing the illegal introduction of warmwater fish for the sole purpose of prospecting for a few "good" years of fishing for the illegally introduced species.

B. Physical Description of Water Proposed for Rehabilitation

1. WATER: Hatch Lake

2. LOCATION: Sec 30 and 31, T35N R40E Stevens County
3. SURFACE ACRES: 34 MAXIMUM DEPTH: 34ft
4. VOLUME: 540 acre-feet; 1,468,800,000 lbs H₂O
5. OUTLET: None
6. STREAM: N/A
7. PUBLIC ACCESS: Yes
8. LAND OWNERSHIP: PUBLIC 2% (WDFW), PRIVATE 98 %
9. ESTABLISHED RESORTS: None on lake

1. WATER: Little Hatch Lake

2. LOCATION: Sec 30, T35N R40E Stevens County
3. SURFACE ACRES: 14 MAXIMUM DEPTH: 10ft
4. VOLUME: 74 acre-feet; 201,960,000 lbs. H₂O
5. OUTLET: None
6. STREAM: N/A FLOW: N/A
7. PUBLIC ACCESS: No
8. LAND OWNERSHIP: 100% private
9. ESTABLISHED RESORTS: None

1. WATER: **Keogh Lake**
2. LOCATION: Sec 19, T35N R40E Stevens County
3. SURFACE ACRES: 18 MAXIMUM DEPTH: 60ft
4. VOLUME: 668 acre feet; 1,860,960,000 lbs. H2O
5. OUTLET: None
6. STREAM: N/A FLOW: N/A
7. PUBLIC ACCESS: None
8. LAND OWNERSHIP: PUBLIC 0% PRIVATE 100 %
9. ESTABLISHED RESORTS: None

C. Proposed Management Actions

1. WATER: **Hatch Lake**
2. TARGET SPECIES: yellow perch
3. DATE LAST REHABED: October, 1999
4. PROPOSED TREATMENT DATE: September-November, 2008
5. REPLANTING DATE: Spring 2009
6. SPECIES: rainbow trout
7. CATCHABLES: 5,000-10,000 FINGERLINGS: 10,000-30,000
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 1 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 1450 lbs., 5 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat spray
10. CREW DESCRIPTION: Leader(s) Chris Donley, Personnel ~ 6

1. WATER: **Little Hatch Lake**
2. TARGET SPECIES: yellow perch
3. DATE LAST REHABED: October, 1988
4. PROPOSED TREATMENT DATE: September-November, 2008
5. REPLANTING DATE: Spring 2009
6. SPECIES: rainbow trout
7. CATCHABLES: 500-1,000 FINGERLINGS: 0-1,000
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 2 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 400 lbs., 5 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/canoe spray
10. CREW DESCRIPTION: Leader(s) Chris Donley, Personnel ~ 6

1. WATER: **Keogh Lake**
2. TARGET SPECIES: yellow perch
3. DATE LAST REHABED: October, 1988
4. PROPOSED TREATMENT DATE: September-November, 2008
5. REPLANTING DATE: Spring 2009
6. SPECIES: rainbow trout
7. CATCHABLES: 500-1,000 FINGERLINGS: 500-1,000
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 1 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 1800 lbs., 5 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/canoe spray
10. CREW DESCRIPTION: Leader(s) Chris Donley, Personnel ~ 6

TOTAL PROPOSED TOXICANT: Rotenone CONCENTRATION:

AMOUNT (ROTENONE AT 5% ACT. INGRED): 3650 lbs. powder and 15 gal. liquid.

II. PURPOSE:

The Washington Department of Fish and Wildlife (DFW) provides many types of fisheries in response to public desires. WDFW manages both trout and warmwater recreational fisheries based on many different species of fish and levels of difficulty. Public demand for and participation in production trout fisheries is high. These fisheries are prized as opportunities for families to recreate together, as well as providing an appropriate challenge for occasional or novice anglers. Winter season trout fisheries provide a relaxed recreational opportunity, give anglers outdoor opportunity during the winter months, and are also integral to the state and local economies.

Hatch, Little Hatch and Keogh Lakes have a long history of being managed as trout fisheries. Little Hatch and Keogh Lake are both privately owned lakes that have been stocked sporadically by the State of Washington. Generally, when fish have been stocked in these lakes public access is granted for fishing. Given changing ownership and public use problems these lake are not currently stocked with trout by the State of Washington, or open to public fishing. However, these lakes will be treated with rotenone to prevent the re-infestation of yellow perch into Hatch Lake. To replace the lost fishery those private owners will experience Little Hatch and Keogh will be stocked with hatchery trout for at least 2 years following treatment.

Alternatives to rehabilitation are costly or impractical. To maintain a comparable fingerling-stocked trout fishery in these waters with catchable-sized fish would take 15,000 – 25,000 catchable rainbow. Stocking catchable sized fish costs almost ten times the cost of a fry plant, and Region One lacks the hatchery space and water to institute a catchable fish-stocking program as a substitute for lake rehabilitation. Spring fry survival in lakes free of competing species ranges from 50-80 percent. Regardless of fish size at stocking, interspecific competition with yellow perch limits fish growth and condition significantly. Ultimately, trout recruitment and fish quality lead to an undesirable trout fishery.

III. INTENDED OUTCOME/MEASURE OF SUCCESS:

WDFW intends to restore Hatch Lake to a popular, easily accessible trout fishery based on fingerling-stocked trout. The average catch rates should be 3 to 5 fish/angler on the opener with a sustained harvest of 2 to 3 fish/angler for the remainder December 1 to March 31 season. Spring fry should be a minimum of 11 inches, and carryover harvest should be 10 to 15 percent of the overall harvest. Success will be measured during Opening Day and random creel contacts and biological surveys. Given a reasonable chance of reducing the populations of undesirable species dramatically, the beneficial effects should last approximately 8 to 10 years under current management schemes. In addition to reasons listed under Resource, Recreational and Economic The consequence of abandoning this lake as a trout fishery is to invite other incursions across the state in trout only managed lakes.

IV. RESOURCE IMPACTS:

1. The population of the target species, yellow perch, will be severely and negatively impacted. Yellow Perch is an exotic species that is not desired for a fishery under the current lake management plan.
2. Regional Lands, Habitat, Wildlife and Non-Game managers have been appraised of our rehabilitation plans. No unmitigated concerns have been expressed on the potential impacts to non-targeted species.
3. According to Bradbury (1986), the effects of rotenone on benthos are variable, depending on the concentrations and species. Crustaceans are most tolerant while the smaller insects are most affected. Immediate reduction of populations averages 25%, and survival doubles when access to bottom sediments exists. Benthic communities generally recover to at least pretreatment levels within two months. Zooplankton is more severely impacted, and communities generally take two to twelve months to fully recover. While relatively tolerant of even heavy doses of rotenone, amphibians (especially larval) are at risk, and herptiles are affected somewhat less so. Almost no chance of eliminating an entire population exists.
4. Loss of the 2008 winter fishery will occur for Hatch Lake, the fishery will begin December of 2009. Catchable sized fish will be stocked in Little Hatch and Keogh so that there will be a spring 2009 fishery. During the planned period of treatment, the lakes will be closed to angling, and to other recreational uses such as boating, and swimming will be curtailed.
5. Professional biologists and other naturalists have visited these sites frequently over the past 40 years. To our knowledge, no endemic, rare, threatened or otherwise listed species will be impacted by the rehabilitation.

V. MITIGATING FOR ADVERSE IMPACTS:

1. Catchable-sized fish are available the following spring, no loss of recreational fishing time will occur for Little Hatch or Keogh Lakes. Trout fry survival and growth for all the proposed waters will be greatly enhanced, and future trout fisheries will attain their previous status. No removal of dead fish is planned as the nutrient base contained therein is best returned to the lake.
2. Fall rehabilitation will not interfere with waterfowl spring nesting. The eradication of yellow perch will also benefit waterfowl through increased production of invertebrates. Stocked populations of trout will not be anywhere near as numerous as the current yellow perch population.
3. Livestock use of the waters to be treated will not be significantly affected. The concentration of rotenone used in the treatment will be far below that considered harmful to mammals. The landowners will be notified of the rehabilitation and consequent exposure of livestock to rotenone.

4. No endemic, rare, threatened or otherwise listed species are known to inhabit this area.
5. Protective wear for the eyes, face and hands will be available for all applicators of rotenone.
6. Lakes will be posted according to Department of Ecology guidelines to notify the public of the treatment, and discourage the public from possessing or consuming dead fish.

VI. RECREATIONAL IMPACT: ALSO SEE PROPOSAL I.A.

Angler success should reach three to five fish per trip on the opener and 2-3 fish/angler sustained harvest for the duration of the season. Yearling trout should average about 11 inches. Carryovers should be expected to be about 10 to 15 percent of the catch and average 15 inches for 2-year-olds and 18 inches for 3-year-olds.

VII. ECONOMIC IMPACTS:

An estimated minimum of 2,500 trips made to Hatch Lake as a result of the proposed management action would result in an increased economic impact totaling \$95,000 per year (1991 dollars; based WDW estimate of \$37.90 per trip). If the project is successful for 8 years it will generate a minimum of \$760,000 in economic activity. The total annual cost to plant these lakes with rainbow trout fry is less than \$2,000. The rehabilitation will cost the Department about \$30,000 (including costs of rotenone, time, travel). The investment by the state is realized more than 10-fold in economic activity after the second year following treatment.

Estimates for the cost of the enforcement action necessary to curtail the activity of the individuals responsible for illegal fish plants are not available. However, this cost might be looked upon as a statewide expenditure since some preventive benefit would certainly occur as perpetrators find out the Department takes illegal transport and planting of fish very seriously.

VIII. RELATED MANAGEMENT ACTION:

See I.C.6. for fish planting data

Increased penalties and enforcement activities are desirable if WDFW is ever going to dissuade illegal stocking of state managed waters. Educating the public about the costs in Department dollars and time with emphasis on what WDFW might be able to accomplish with those resources would be a very worthwhile activity for WDFW Public Affairs. This may result in stemming recruitment to this ill advised group and turning local opinion against the offenders.

IX. PUBLIC CONTACT:

Public meetings will be held during July 2008 in Ephrata, Spokane, Colville and Olympia to explain WDFW's 2008-09 rehabilitation proposals, assess public opinion, and address local concerns.

Initiated by: Region One, District 2 Fisheries Management

LAKE MANAGEMENT PLAN

Updated June, 2008 – C. Donley

Water: Williams Lake (Stevens Co.)

Location: Williams Lake is located 14.5 miles north of Colville

	Size:	Max Depth:	Volume:
Williams Lake	38 acres	47 ft	1,058 acre feet

Water Source: Mostly groundwater seep, with limited overland flow. There is no defined intermittent or year-round stream that feeds into this lake.

Outflow: Intermittent outflow leading to adjacent wetlands. Outflow will be dry during time of treatment

Management History:

Williams Lake has been historically managed as a production winter season trout fishery. Williams Lake has provided a consistent winter ice fishery that has been popular for all of the greater Colville to Spokane angling base. The number of winter only fisheries in the greater Spokane area is limited to four production trout lakes. The limited amount of winter fishing opportunity renders Williams Lake highly desirable to provide wintertime recreation.

The presence of undesirable species of fish is the greatest impediment to maintaining trout fisheries in this water. For many years Williams Lake provided an excellent winter fishery with a fish population free of undesirable fish species. Until the 1990s the lake had not been treated with rotenone to eliminate undesirable fish. In the last two decades there appears to be a trend in regards to an increase in illegal introduction of undesirable fish species into Williams Lake. The lake has been treated with rotenone twice since 1996. In 1996, the lake was treated to eliminate largemouth bass and carp. In 2002, the lake was treated to eliminate illegally introduced goldfish. Currently the problem fish species is yellow perch. The increased desire by "bucket biologists" to confound our fish management efforts on this lake has lead to a considerable loss of recreational and economic value for the greater Colville area. In an attempt to prevent repeated illegal stocking, WDFW has enacted the fishing regulation that precludes anglers from harvesting any species other than trout from this water. The intent of the regulation is to diminish the value of illegal introductions if the fish cannot be harvested.

T&E Flora and Fauna: Professionals from many resource agencies have visited this site countless times during the last 50 years. No known report exists of any threatened or endangered species habitually found in or near these lakes. Occasional visits from both bald and golden eagles occur, although no nests of these two species are known in the area. Protected species of waterfowl and other birds frequently are found here at times, as well.

Current Management Objectives:

Williams Lake is a winter opener, December 1 to March 31, production fishery. Five trout limit, no size or gear restrictions. Provide 2 to 5 rainbow trout per angler trip with a carryover harvest rate of 10 to 15 percent. Fishery should generate a minimum of 2,500 angler-trips per season.

1. Fishery Objectives:

Species	Type	Category	Fish/Hour	Fish/Angler	Exploit. Rate
Rainbow	Production	Opening Day	2	3 to 5	85%- 90% 1 yr cohort
Rainbow	Production	Remainder of season	1	2 to 3	85%-90% 1 yr cohort

2. Angler use objective (# angler days): Season – 2,500 angler days on water

3. Stocking Objectives:

<u>Lake</u>	Species	Number of Fish Stocked			Planting Month
		Total	/Acre	/Pound	
Williams	Rainbow	15,000	394	<100	April-May
	Rainbow	7,500	175	≤ 5	March-April, <i>first year post rehabilitation</i>
Year 2	Rainbow	18,000	473	<100	April-May
Year 3	Rainbow	18,000	473	<100	April-May

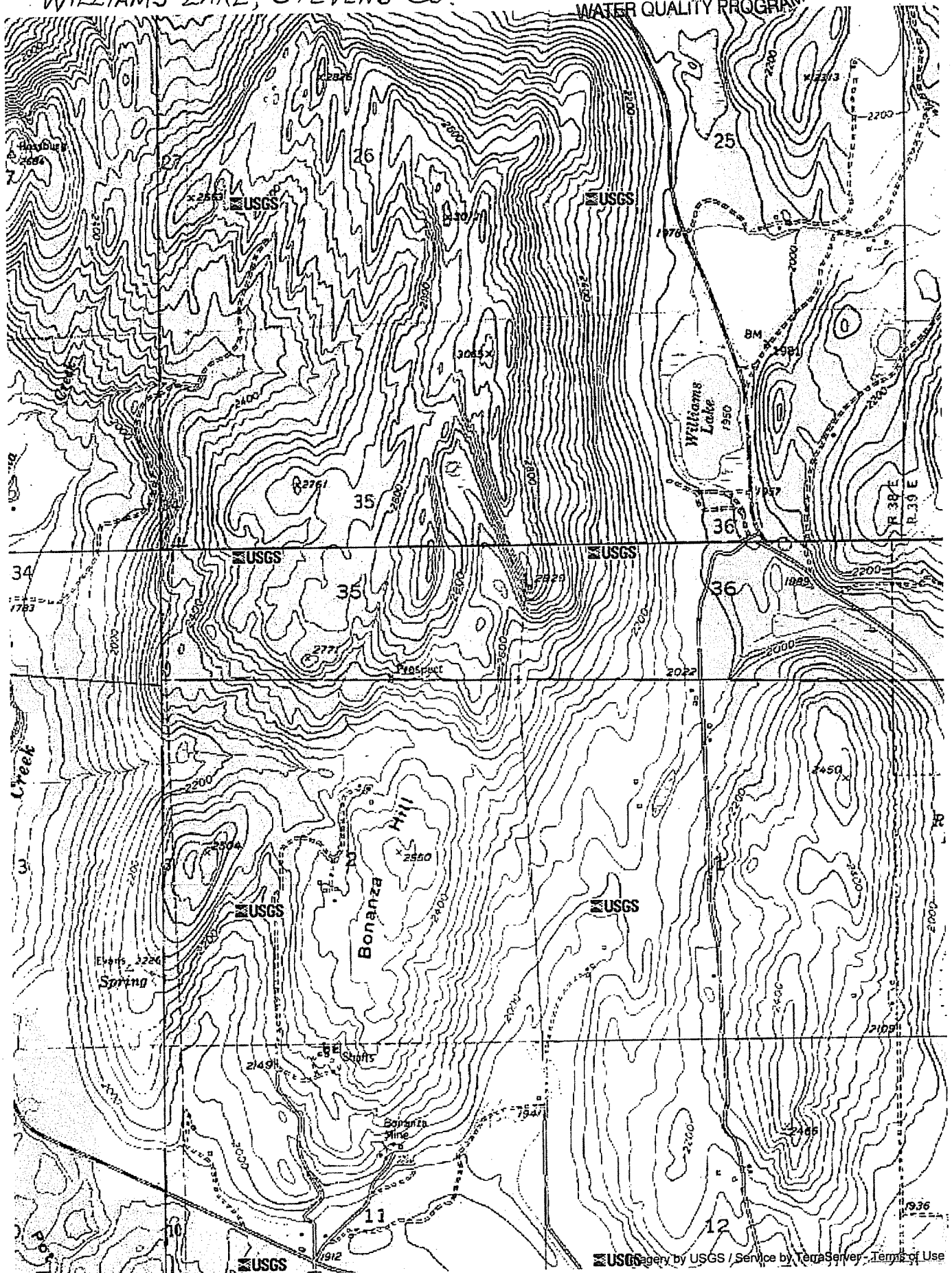
Management Strategy:

- Plant rainbow fry and catchables in spring.
- Check yearling growth; should be about 11 inches, adjust stocking rate as necessary.
- Harvest 85%-90% of yearling fish by end of season.
- Monitor all fish species periodically by electrofishing or netting.
- Control undesirable species with rotenone when trout survival is inadequate to produce an acceptable fishery.

WILLIAMS LAKE, STEVENS CO.

MAY 15 2000

WATER QUALITY PROGRAM



RECEIVED FOR THE DIRECTOR

MAY 1 1966

RECEIVED FOR THE DIRECTOR

PRE-REHABILITATION PLAN

Williams Lake (Stevens County)

I. PROPOSAL

A. Justification for Proposed Rehabilitation

Williams Lake has historically been a popular winter trout fishery in the Colville area. Illegal introductions of goldfish and now yellow perch have plagued trout production on this lake for the past 10 plus years. Through regulation modification and the use of rotenone to rehabilitate the lake, it is anticipated that this lake will return to a productive winter trout fishery.

Williams Lakes has been illegally stocked with yellow perch. The resulting perch populations in this lake provided two to three years of desirable fishing before stunting occurred and the lake was no longer viewed as a desirable fishery for perch or trout. The lake is currently at the point where the perch have become stunted. WDFW is proposing to rehabilitate the lake and restock with rainbow trout. Similar to Hatch Lake in the Colville area, it appears there are anglers that have discovered that following rotenone treatment they can illegally plant perch and profit from an expanding perch population for several years prior to the fish becoming stunted. To combat these "bucket biologists" WDFW enacted a regulation on Williams Lake to make it "catch and release except for trout". The intent of the new regulation was to make harvesting any species from the lake other than trout illegal. Thus, preventing the illegal introduction of warmwater fish for the sole purpose of prospecting for a few "good" years of fishing for the illegally introduced species.

B. Physical Description of Water Proposed for Rehabilitation

1. WATER: Williams Lake
2. LOCATION: Sec 36, T38N R38E Stevens County
3. SURFACE ACRES: 38 MAXIMUM DEPTH: 47ft
4. VOLUME: 1,058 acre-feet; 2,665,600,000 lbs H₂O
5. OUTLET: None
6. STREAM: N/A
7. PUBLIC ACCESS: Yes
8. LAND OWNERSHIP: PUBLIC 98% (WDFW), PRIVATE 2 %
9. ESTABLISHED RESORTS: None on lake

C. Proposed Management Actions

1. WATER: Williams Lake
2. TARGET SPECIES: yellow perch
3. DATE LAST REHABED: October, 2002
4. PROPOSED TREATMENT DATE: September-November, 2008
5. REPLANTING DATE: Spring 2009
6. SPECIES: rainbow trout
7. CATCHABLES: 5,000-10,000 FINGERLINGS: 10,000-30,000
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 1 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 2650 lbs., 10 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat spray
10. CREW DESCRIPTION: Leader(s) Chris Donley, Personnel ~ 6

II. PURPOSE:

The Washington Department of Fish and Wildlife (WDFW) provides many types of fisheries in response to public desires. WDFW manages both trout and warmwater recreational fisheries based on many different species of fish and levels of difficulty. Public demand for and participation in production trout fisheries is high. These fisheries are prized as opportunities for families to recreate together, as well as providing an appropriate challenge for occasional or novice anglers. Winter season trout fisheries provide a relaxed recreational opportunity, give anglers outdoor opportunity during the winter months, and are also integral to the state and local economies.

Alternatives to rehabilitation are costly or impractical. To maintain a comparable fingerling-stocked trout fishery in these waters with catchable-sized fish would take 15,000 – 25,000 catchable rainbow. Stocking catchable sized fish costs almost ten times the cost of a fry plant, and Region One lacks the hatchery space and water to institute a catchable fish-stocking program as a substitute for lake rehabilitation. Spring fry survival in lakes free of competing species ranges from 50-80 percent. Regardless of fish size at stocking, interspecific competition with yellow perch limits fish growth and condition significantly. Ultimately, trout recruitment and fish quality lead to an undesirable trout fishery.

III. INTENDED OUTCOME/MEASURE OF SUCCESS:

WDFW intends to restore Williams Lake to a popular, easily accessible trout fishery based on fingerling-stocked trout. The average catch rates should be 3 to 5 fish/angler on the opener with a sustained harvest of 2 to 3 fish/angler for the remainder of the December 1 to March 31 season. Spring fry should be a minimum of 11 inches, and carryover harvest should be 10 to 15 percent of the overall harvest. Success will be measured during Opening Day and random creel contacts and biological surveys. Given a reasonable chance of reducing the populations of undesirable species dramatically, the beneficial effects should last approximately 8 to 10 years under current management schemes. In addition to reasons listed under Resource, Recreational and Economic Impacts, to abandon this lake as a trout fishery is to invite other incursions across the state in trout only managed lakes.

IV. RESOURCE IMPACTS:

1. The population of the target species, yellow perch, will be severely and negatively impacted. Yellow Perch are an exotic species that is not desired for a fishery under the current lake management plan.
2. Regional Lands, Habitat, Wildlife and Non-Game managers have been appraised of our rehabilitation plans. No unmitigated concerns have been expressed on the potential impacts to non-targeted species.
3. According to Bradbury (1986), the effects of rotenone on benthos are variable, depending on the concentrations and species. Crustaceans are most tolerant while the smaller insects are most affected. Immediate reduction of populations averages 25%, and survival doubles when access to

bottom sediments exists. Benthic communities generally recover to at least pretreatment levels within two months. Zooplankton is more severely impacted, and communities generally take two to twelve months to fully recover. While relatively tolerant of even heavy doses of rotenone, amphibians (especially larval) are at risk, and herptiles are affected somewhat less so. Almost no chance of eliminating an entire population exists.

4. Loss of the 2008 winter fishery will occur for Williams Lake, the fishery will begin December of 2009. The lake will be closed to angling, and other recreational uses such as boating, and swimming will be curtailed during the planned period of treatment.

5. Professional biologists and other naturalists have visited these sites frequently over the past 40 years. To our knowledge, no endemic, rare, threatened or otherwise listed species will be impacted by the rehabilitation.

V. MITIGATING FOR ADVERSE IMPACTS:

1. Trout fry survival and growth for the proposed water will be greatly enhanced, and the future trout fishery will attain the previous status. No removal of dead fish is planned as the nutrient base contained therein is best returned to the lake.

2. Fall rehabilitation will not interfere with waterfowl spring nesting. The eradication of yellow perch will also benefit waterfowl through increased production of invertebrates. Stocked populations of trout will not be anywhere near as numerous as the current yellow perch population.

3. Livestock use of the waters to be treated will not be significantly affected. The concentration of rotenone used in the treatment will be far below that considered harmful to mammals. The landowners will be notified of the rehabilitation and consequent exposure of livestock to rotenone.

4. No endemic, rare, threatened or otherwise listed species are known to inhabit this area.

5. Protective wear for the eyes, face and hands will be available for all purveyors of rotenone.

6. Lakes will be posted according to Department of Ecology guidelines to notify the public of the treatment and discourage the public from possessing or consuming dead fish.

VI. RECREATIONAL IMPACT:

See Section III.

Angler success should reach three to five fish per trip on the opener and 2-3 fish/angler sustained harvest for the duration of the season. Yearling trout should average about 11 inches. Carryovers should be expected to be about 10 to 15 percent of the catch and average 15 inches for 2-year-olds and 18 inches for 3-year-olds.

VII. ECONOMIC IMPACTS:

An estimated minimum of 2,500 trips made to Williams Lake as a result of the proposed management action would result in an increased economic impact totaling \$95,000 per year (1991 dollars; based on a WDW estimate of \$37.90 per trip). If the project is successful for 8 years it will generate a minimum of \$760,000 in economic activity. The total annual cost to plant these lakes with rainbow trout fry is less than \$2,000. The rehabilitation will cost the Department about \$30,000 (including costs of rotenone, time, travel). The investment by the state is realized more than 10-fold in economic activity after the second year following treatment.

Estimates for the cost of the enforcement action necessary to curtail the activity of the individuals responsible for illegal fish plants are not available. However, this cost might be looked upon as a statewide expenditure since some preventive benefit would certainly occur as perpetrators find out the Department takes illegal transport and planting of fish very seriously.

VIII. RELATED MANAGEMENT ACTION:

See I.C.6. for fish planting data

Increased penalties and enforcement activities are desirable if WDFW is ever going to dissuade illegal stocking of state managed waters. Educating the public about the costs in Department dollars and time with emphasis on what WDFW might be able to accomplish with those resources would be a very worthwhile activity for WDFW Public Affairs. This may result in stemming recruitment to this ill-advised group and turning local opinion against the offenders.

IX. PUBLIC CONTACT:

Public meetings will be held during July 2008 in Ephrata, Spokane, Colville and Olympia to explain WDFW's 2008-09 rehabilitation proposals, assess public opinion, and address local concerns.

Initiated by: Region One, District 2 Fisheries Management

**PRELIMINARY LIST OF 2009-2010
PROPOSED WATERS FOR TREATMENT**

Attachment 1: Waters Proposed by WDFW for Treatment With Rotenone

2009 1 April 2009

Name Location		Grid Location			Size	Rotenone required @ 5%		Treatment History		Proposed Treatment		
County	Water	Section	Township	Range	Acres	Acres	Powder (lbs.)	Liquid (gal.)	Years Previously Treated	Target Species	Treatment Dates	Outflow at Treatment
District 1												
Pend Oreille	Cee-Cee-Ah Creek Native Trout Restoration	1,11,12,14,15,21,22,28	34N	44E	TBD +/- 1 cfs		0		10	2008	Non-native trout	Sept. 2009 KMN04 Neutralization at Falls
Lincoln - Adams	Fourth of July Lake	1,2	20N	38E	112	2,016	21,773		30	1958	fathead minnow	Fail 2009 None at time of treatment
Lincoln/Spokane Co.	Fishtrap Lake	1,12,13	21N	39E	202	4,085	33,089		25	58,61,69,76,83,89,98,03	BBH, TNCH	Fail 2009 Water Control Structure None at time of treatment
		31	22N	40E								
		36	22N	39E								
Spokane Co.	Hog Canyon Lake	19,20,29,30	22N	40E	44	239	2,581		15	58,61,69,76,83,89,98,03	PS,BBH,TNCH	Fail 2009 None at time of treatment To Fishtrap Lake
	Hog Canyon associated waters	30,31	22N	40E					100	58,61,69,76,83,89,98,03		
Spokane Co.	West Medical Lake	11,12,13,24	24N	40E	223	5,041	18,400		100	57,63,71,93,00	PS	Fail 2009 None at time of treatment
Stevens Co.	Pepon Lake	6,7	39N	39E	36.1	283	765		10	1962	PS	Fail 2009 Beaver dam at Outlet?
District 5												
Adams/Grant Co.	North Teal Lake	32	17N	29E	20.7	345	1,836		15	59,63,69,71,75,82,90,99	PS,CP	Fail 2009 To South Teal Lake
	South Teal Lake	5	16N	29E	29.5	449	2,788		15	59,63,69,71,75,82,90,99	PS,CP	Fail 2009 To Herman Lake
		32	17N	29E								
	Herman Lake	5,8	16N	29E	35.4	460	2,448		10	59,69,75,82,90,99	PS,CP	Fail 2009 To Lytle Lake
	Lytle Lake	8	16N	29E	11.7	45	272		20	59,69,75,82,90	PS,CP	Fail 2009 None at time of treatment
	Thread Lake	8,16,17,21	16N	29E	29	128	966		10	69,75	PS,CP	Fail 2009 None at time of treatment
Grant Co.												
"Canal Chain"	Heart Lake	28	17N	29E	26	885	2,385		5	59,87,90,97	PS	Fail 2009 Canal Lake
	June Lake	21,22	17N	29E	11	156	420		10	90,97	PS	Fail 2009 NN Windmill Lake
	North North Windmill Lake	22	17N	29E	4	44	120		10	90,97	PS	Fail 2009 North Windmill Lake
	North Windmill Lake	27	17N	29E	20	342	921		10	75,90,97	PS	Fail 2009 Windmill Lake
	Windmill Lake	27,28	17N	29E	37	1,074	5,788		5	68,75,82,87,90,97	PS,CP	Fail 2009 Canal Lake
	Canal Lake	28,33	17N	29E	92	1,960	10,566		10	59,68,75,82,87,90,97	PS,CP	Fail 2009 Pit Lake - can be blocked
	Pit Lake	33	17N	29E	23	187	1,005		20	60,63,68,72,75,80,90,97	PS,CP	Fail 2009 Drains to North Teal Lake
	North Teal Lake	32	17N	29E	21	345	0		0	59,63,69,71,75,82,90,99	PS,CP	Fail 2009 None - Gabion
Grant Co.												
"Desert Chain"	Aztec Lake	27	18N	26E	3	25	67		10	Never Treated	PS,BG,LMB	Fail 2009 None
	Dune Lake	36	18N	26E	8	70	350		5	Never Treated	PS,BG,LMB	Fail 2009 None
	Harris Lake	36	18N	26E	39	353	980		10	84,97	PS,BG,LMB	Fail 2009 None at time of treatment
	Sedge Lake	36	18N	26E	9	85	450		5	Never Treated	PS,BG,LMB	Fail 2009 None
	Tern Lake	36	18N	26E	8	70	350		5	Never Treated	PS,BG,LMB	Fail 2009 None
	Lizard Lake	6	17N	27E	3	25	67		10	Never Treated	PS,BG,LMB	Fail 2009 None
	Meadowlark Lake	6	17N	27E	3	25	67		10	Never Treated	PS,BG,LMB	Fail 2009 None
Grant Co.												
	Beda Lake	15,22	18N	26E	50	352	2,340		80	76,84,96,00	PS	Fail 2009 None
	Brookies Lake	22	18N	26E	20	201	1,525		70	73,76,84,96	PS	Fail 2009 None
District 6												
Okanogan	Buck Lake (Chewuch)	22	36N	21E	15.3	200	680		10	Never Treated	YP	Fail 2009 None at time of treatment
	Aeneas	25	37N	26E	61	1,525	4,122		10	1997	Cottids	Fail 2009 None at time of treatment
	Schalow Pond	22	36N	25E	10	80	162		10	1982	LMB	Fail 2009 None, Dam at outlet
1 April 2009					1,207	21,075	117,283		665			

